Environmental Consequences

Chapter 4

Introduction

Chapter 4 discusses the environmental consequences and effects of the alternatives. Using Chapter 3 information as the baseline for comparison, each alternative is addressed by issue/resource. This chapter is organized by alternative for all major issues except for economics. A section displaying the effects of the alternatives on other resources that did not drive alternatives follows the effects discussions by alternative. Next, cumulative effects are disclosed. The last section "Specifically Required Disclosures", demonstrates how the alternatives comply/do not comply with major laws, regulations, policies, and Executive Orders governing Grassland management.

The following are headings described under each major issue/resource.

Scope/Scale of Analysis:

This section describes the area in which a specific resource may be affected by the alternatives. Each resource or issue may be discussed at various scales, depending upon the issue. For example, socioeconomics may be discussed at the local, county, and state scale.

The spatial and temporal scale used to address each issue is identified in the Alternative A (No Action) discussion and applies to all alternatives. This information is not repeated under each alternative discussion. **Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.**

Direct and Indirect Effects of Each Alternative:

This section describes the direct effects, those effects occurring at the same time and place, and indirect effects, those effects that occur at a later time or at a different place.

In the case of Forest and Grassland planning, the effects analysis "should consider trends and sustainability in the long term while direct impacts are considered less" (EPA Letter, April 6, 2001). In this Grassland EIS, many of the direct and indirect effects are, in fact, cumulative effects due to the large scale and long time frame considered. For instance, watershed and riparian effects include impacts and activities on private, state, and BLM lands. Those effects and outcomes are disclosed decades into the future. The vegetation and wildlife sections discuss changes, not only on the Grassland, but also in the Greater Curlew Valley. Changes from wildfire, succession, and other activities are displayed over several temporal scales, up to 100 years in the future. Thus, the previous effects analysis has generally considered past, present and

reasonably foreseeable actions across administrative boundaries. Most often, effects are analyzed at two scales: The Greater Curlew Valley and the 47,600-acre portion of the Curlew National Grassland under Forest Service administration.

Cumulative Effects of Each Alternative:

This section describes the cumulative effects, those impacts or effects on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the action. Cumulative effects or impacts can result from individually minor, but collectively significant, actions taking place over a period of time. **The cumulative effects discussion begins on page 4-191**. Where the previous direct and indirect effects analysis does not adequately disclose cumulative effects, we have augmented the discussion in this section. Cumulative effects are discussed only for those resources impacted by these alternatives.

Irretrievable or Irreversible Effects of Each Alternative:

Irretrievable effects apply to losses of production or commitment of renewable natural resources. For example, some or all of the forage production from an area is irretrievable lost during the time it is used for a winter recreation event. If the use is changed, forage production can be resumed. The production lost is irretrievable, but the action is not irreversible. Irreversible applies primarily to the use of non-renewable resources, such as minerals or cultural resources, or to those factors that are renewable over long time spans, such as soil productivity. Irreversible also includes the loss of future options.

Alternative A – No Action

Summary Description of Treatments

In Alternative A, current Forest Plan direction would continue with 45,594 acres determined to be suitable for livestock grazing. The remaining 1,006 acres would not be suitable for livestock grazing.

Alternative A would treat 18,750 acres of sagebrush over the next ten years, primarily using prescribed fire. The majority of sagebrush acres would be managed on a twenty-year rotation of vegetation treatments to provide forage for permitted livestock. Treatments would be large scale (up to 1,000 acres).

Table 4.1 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.1. Alternative A.
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition on Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome Percent of Sagebrush Acres	Desired Future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	29% of acres	34% of acres
6%-15% canopy cover	24% of acres	25% of acres	33% of acres
Greater than 15% canopy cover	59% of acres	46% of acres	33% of acres

Grazing would be permitted at the 60 percent utilization level on all vegetation types, including native, non-native and riparian. A total of 21,480 head months of livestock are currently permitted to graze.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

• Riparian and Watershed Management

Watershed Condition

Scale of Analysis:

Watersheds were analyzed at two different scales: the largest scale included the entire watersheds within the Greater Curlew Valley Area. Information from United States Geological Survey (USGS), State of Idaho and State of Utah, and the Environmental Protection Agency (EPA) were used to establish existing condition. (See Chapter 3 for discussion.)

Portions of these larger watersheds within the Grassland were analyzed using Inland West Reconnaissance data (1998) and Properly Functioning Condition assessments (1998).

Effects of the alternatives were assessed for the end of the ten-year Plan period and for long-term conditions.

Scope:

The watershed analysis focuses on overall watershed condition ratings based on upland vegetation treatments, livestock utilization levels, and recreation, specifically roads, in each alternative. Acres disturbed at any one time and potential erosion in tons/year over natural rates are the two indicators used to display the differences between alternatives.

Many natural and human factors affect watershed condition, function and stability, including the type and location of soils, topographic features, vegetation types and densities, the type, amount, duration, and frequency of precipitation, drainage densities and channel types, and physical disturbances, such as roads, mining and livestock grazing (Branson, *et al*., 1981).

Of these, only two variables affected by physical disturbances – the type and density of plants (including cryptograms and other vegetative ground cover) and soil quality, including erosion and compaction – are generally influenced by management actions (Johnson, *et al*., 1980). Because of the close association between water runoff and soil erosion, any practice that influences or controls runoff also influences erosion and downstream sedimentation. Differences in runoff are related to the amount of plant cover and litter accumulation protecting the soil, the physical features of the soil profile, slope of terrain, and the timing, intensity and duration of precipitation events (Blaisdell, *et al*., 1982; Branson and Owen, 1970).

Overall soil productivity is generally maintained if erosion does not exceed 5 tons per acre per year (USDA-NRCS, 1996). Table 4.2 shows the relative differences in predicted erosion and sedimentation delivery rates based on percent ground cover and watershed slope, based on outputs from the Forest Service interfaces for the Water Erosion Prediction Project computer model (FSWEPP). These values are not absolutes but serve to illustrate relative differences between alternative scenarios. These values are used as the basis for discussing relative differences between the alternatives. For example, FSWEPP predicts erosion rates of less than

one ton per acres on areas having 80 percent ground cover on a 30 percent slope. Under this scenario, it is unlikely that overall soil productivity or watershed function would be inhibited. Conversely, if a management action is taken that reduces cover to 0 percent on the same 30 percent slope, erosion rates could increase to about ten tons per acre, nearly two times higher than the five ton per acre general soil productivity threshold. In this situation, it is highly likely that overall soil productivity thresholds and watershed functions could be exceeded or inhibited. This condition could last until ground cover re-establishes around 60 percent or greater. Model documentation, assumptions and limitations can be found at the model website: fsfed.Moscow.rmrs.fs.fed.us/fswepp.

Table 4.2. Relative Differences in Predicted Erosion and Sedimentation Delivery Rates Based on Percent Ground Cover and Watershed Slope

Percent Ground Cover (%)	Slope (%)	Short Grass Soil Erosion tons/acre average precipitation	Short Grass Soil Erosion tons/acre 15-year precipitation	Short Grass Soil Erosion tons/acre 30-year precipitation	Low Intensity Fire Soil Erosion tons/per average precipitation	High Intensity Fire Soil Erosion tons/acre average precipitation	Yearly probability of sediment delivery to a stream channel (%)
0%	0%	0.0	0.0	0.08		0.0	17%
	5%	0.12	0.92	1.42		0.26	33%
	10%	0.39	1.78	3.81		0.61	40%
	20%	0.78	3.2	6.83		1.27	43%
	30%	1.09	4.6	9.27		1.81	43%
20%	0%	0.0	0.0	0.0			0%
	5%	0.09	0.92	1.09			27%
	10%	0.28	1.71	3.03			37%
	20%	0.60	2.75	5.85	0.71		40%
	30%	0.83	3.99	8.03			40%
30%	0%	0.0	0.0	0.0	0.0		0%
	5%	0.09	1.19	1.19	0.12		27%
	10%	0.22	1.64	2.59	0.24		30%
	20%	0.45	2.56	4.91	0.49		33%
	30%	0.65	3.36	7.00	0.72		33%
40%	0%	0.0	0.0	0.0			0%
	5%	0.06	0.78	0.87			23%
	10%	0.17	1.54	2.02			27%
	20%	0.36	2.41	3.93			33%
	30%	0.52	3.13	5.15			33%
60%	0%	0.0	0.0	0.0			0%
	5%	0.03	0.36	0.70			13%
	10%	0.07	0.79	1.13			17%
	20%	0.13	1.62	1.80			17%
	30%	0.20	2.27	2.36			17%
80%	30%	0.03	0.0	0.91			3%

The table assumes silt loam soils, using the Burley, ID CAA weather data, over a 30 year time period.

Vegetation treatments, livestock grazing, and recreation to a lesser degree, are the primary management activities that influence plant densities, ground cover, and soil quality, including

compaction. Moderate grazing intensities do not generally adversely impact the soil profile, except in small, localized areas around salt and watering sites and loitering areas. Generally, these isolated sites do not affect the overall condition of the soils within the watershed (Johnson, *et al*., 1980; Blackburn, 1983).

Mechanical treatments, such as plowing, can have a substantial effect on soils. Repeated plowing can create a hardened soil layer, reducing water infiltration that can lead to substantial increases in runoff potentials. One-time plowing treatments, on the other hand, can actually increase short-term infiltration capacities (Kohnke, 1968). Regardless, bare soils, whether generated from plowing, fire, or other means, are highly susceptible to accelerated erosion until sufficient protective ground cover is established (Branson, *et al*., 1981; Blaisdell, *et al*., 1982).

Livestock grazing affects plant densities directly through consumption or trampling of vegetation (Blackburn, 1983). Vegetative ground cover currently averages between 40 percent and 80 percent on the Grassland, with areas around watering, loitering and salting areas averaging substantially less than 40 percent. Sixty percent ground cover generally is considered adequate to control runoff and soil erosion (USLE; WEPP). However, as shown in Table 4.2, factors such as soil type, slope, and rainfall intensities can influence the actual amount of runoff and erosion that may occur on any single plot of ground. Natural grass, forbs and shrub communities are capable of achieving ground cover between 70 and 80 percent (USDA-FS, 1997). Seeded sites, specifically bulbous bluegrass areas, are capable of achieving ground cover between 50 and 60 percent. Normally, livestock utilization levels that are light to moderate (less than 60 percent utilization) do not substantially affect overall watershed stability, runoff rates, or erosion (Lacy, 1988).

Road densities within the Grassland are relatively low (USDA-FS, 2001). Localized unimproved roads and Off Highway Vehicle (OHV) trails compact soils and can increase localized runoff and erosion (Swanson, *et al.*, 1998). Overall, the impact of these activities on a watershed scale is minor.

Direct and Indirect Effects:

Alternative A treats an average of 1,850 acres a year, using prescribed fire, over the next decade. Prescribed fire treatment requires two to four years to recover vegetation ground cover to a minimum of 60 percent for soil protection. Over the ten-year plan period, up to 7,400 acres (15 percent of Grassland watersheds) could be in a disturbed condition each year, once the treatment program reaches the fourth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability could be less than if impacts were concentrated in a single watershed.

Prescribed fire treatments in this alternative would remove most, if not all, vegetative ground cover in the treated areas. Until vegetation is reestablished, surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement (Branson, *et al.*, 1981). No reseeding of treated areas is proposed in this alternative. Vegetation that exists prior to treatment would be expected to regenerate after treatment. Ground cover

potential on these sites would remain at 60-80 percent on native sites and 50-60 percent on non-native sites.

Using the Forest Service WEPP (Water Erosion Prediction Project) computer model, predicted erosion rates at the site-specific level can range from near 0 tons per acre to nearly ten tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have erosion rates ranging from near 0 tons to about 1.4 tons per acre, depending on residual ground cover and the intensity of precipitation following the treatment. Using this field scenario and assuming up to 7, 400 acres would be in a disturbed condition beginning in year 4 of the treatment program proposed in this alternative, an increase in erosion rates could range from near 0 tons to as much as 10,360 tons per year. If increased runoff and erosion from treated sites caused primary channels to scour or fill overall watershed stability could be affected.

Livestock grazing at current utilization rates would maintain overall existing ground cover. Hoof action could continue to detrimentally impact microbiotic crusts over time (Branson, *et al*., 1981).

Road densities are relatively low. Localized unimproved roads and Off Highway Vehicle (OHV) trails compact soils and can increase localized runoff and erosion. Overall, the impact of these activities on a watershed scale would be minor. In this alternative, travel management would not change from the existing situation. Long-term effects from recreation on watershed condition would remain about the same as the current situation.

Overall, watershed conditions within the Grassland would be expected to decline initially as substantial acres are treated and percent ground cover is decreased. As ground cover is reestablished, watershed conditions would improve to near present ratings as discussed in Chapter 3.

Total watershed ratings, including both public and private land, would not be expected to improve over current conditions without improvements in soil conservation and runoff control watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site would be degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer provide a viable ground cover source. As long as these conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass area, potential ground cover would be less than the sites that support native plant species. Watershed condition would be maintained at less than potential in these areas. As long as non-native species, such as

bulbous bluegrass, dominate a site, ground cover potential of native sites would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which results in increased runoff and erosion potential.

There are no proposed management actions within this alternative that would have irreversible effects on watersheds.

Riparian Condition

Scale of Analysis:

Riparian condition was analyzed at the Grassland scale in terms of Riparian Properly Functioning Condition criteria. The analysis considered impacts from sedimentation, runoff, livestock grazing, and proposed vegetation treatments in each alternative. The effects of adjacent land use on riparian areas were also considered in the analysis.

All perennial streams on the Grassland were considered in the analysis.

Scope of Analysis:

The scope of the riparian and water quality analysis focuses on riparian conditions on the Grassland and the effects of grazing utilization levels, proposed vegetation treatments, and other activities are expected to have on existing conditions by alternative.

Effects of the alternatives were assessed for the ten-year plan period and for long-term conditions.

Alternative A

Alternative A proposes to continue management under the existing 1985 Forest Plan. Livestock utilization levels, although not specifically identified in the Plan, generally would be about 60 percent for all vegetation types, including riparian vegetation, as defined in site-specific Allotment Management Plans. Approximately 18,750 upland acres are proposed for treatment, primarily using prescribed fire. No treatments are planned in riparian areas.

Direct and Indirect Effects:

Within the last two or three years, several riparian pastures have been created to reduce impacts from livestock grazing on riparian areas. Currently, no specific utilization or allowable impact standards or guidelines have been identified for the riparian pastures. "Time-in-pasture" is limited to seven to twenty days, depending on the pasture (K. Timothy, pers. comm.., 2001). Impacts to riparian areas and stream channels in these pastures have been somewhat mitigated by these measures.

The riparian pasture along South Fork Rock Creek should contribute to a reduction in the overall sediment loading to this 303(d) water quality limited stream, but without specific guidelines or criteria specifying vegetation use or allowable stream bank disturbance, the riparian pasture, under current practices and utilization levels, may not reduce sediment loading to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in the remainder of the streams within the Grassland would remain essentially the same as current conditions. This alternative does not meet the intent of the Clean Water Act or Idaho's antidegradation policy.

About fourteen to fifteen miles of the total twenty-four miles of streams on the Grassland are not fenced in riparian pastures or exclosures (K. Timothy, pers. comm.., 2001). In this alternative, riparian areas outside the existing riparian pastures would continue to be impacted at current levels. Riparian areas within the existing riparian pastures should see an improvement over time. The rate of riparian and stream channel recovery within the riparian pastures depends on the actual amount of grazing allowed and the overall existing condition of the channel and riparian area. Initially, improvements in riparian conditions would first be seen in riparian vegetation as it improves in quantity and quality. Once riparian vegetation conditions improve, improvements in overall stream channel condition should follow (Rosgen, 1996).

Stream channels that are currently assessed as functioning or functioning-at-risk would improve first, usually within several years following vegetation recovery. This is because these channels are already within or near dynamic equilibrium with streamflows and sediment transport processes, and usually require only minor adjustments in hydrologic, vegetation or sediment transport functions to become or remain in a healthy or stable condition. More degraded channels that are functioning-at-risk to nonfunctioning would require more time to heal. This is because hydrologic, vegetation or sediment transport processes are further from dynamic equilibrium and greater recovery processes may be required (Rosgen, 1996; Buckhouse, 1981; USDI-BLM, 1998). Channels that have been deeply downcut may take decades to recover because of evolutionary processes and channel adjustment stages that may be required before channel stability can be re-established (Rosgen, 1996).

Impacts from adjacent lands in other ownerships would be expected to continue at present rates. The Grassland contains only a small portion of the entire Rock Creek and Deep Creek watersheds. Impacts from other land ownership will play a primary role in the success of any improvements made within the Grassland. For this reason marginal improvements in overall water quality could be expected for the watersheds.

Approximately ten miles of streams within riparian pastures and exclosures would move toward Properly Functioning Condition (PFC) at a slow rate in this alternative. It would take at least a decade before any substantial channel improvements are realized, because even though impacts are reduced from current rates, grazing impacts are still relatively high. The remaining fourteen miles of streams outside of riparian pastures and exclosures would remain essentially unchanged in existing condition.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Adequate stream channels, riparian area vegetation and water quality would be irretrievably lost as long as degraded riparian conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced (Mosley, *et al*., 1997). The recovery time needed to reverse or rehabilitate a specific stream or riparian area would be dependent on the extent of the degradation and the corrective actions taken (Rosgen, 1996). Riparian areas within fenced pastures should recover slowly over one or more decades. Riparian areas outside of riparian pastures without any specific allowable impact criteria would require a longer recovery period.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to a previous condition (Leffert, personal observations, 2001). Through prudent management practices, some of these channels could be stabilized in the existing condition and overall stability improved; however, to be fully functional, these channels would have to undergo an evolutionary process that could take decades (Rosgen, 1996). In these cases, pre-disturbance channel conditions are no longer achievable which would be an irreversible commitment of this resource.

· Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

Scale of the Analysis:

Two scales were used in the analysis of sagebrush canopy cover: The Greater Curlew Valley Area (GCVA), a 524,000-acre area of private, BLM, Forest Service and State lands, and the 47,600-acre portion of the Curlew National Grassland under Forest Service administration. The temporal scale of the analysis addresses the existing condition, the ten-year outcome and the 50- to 100-year long-term goals to compare alternatives.

Scope of the Analysis:

The scope of this analysis focuses on sagebrush canopy cover changes over time as a result of treatments proposed in each alternative. Comparisons are made between the existing condition, the ten-year outcome of the proposed treatments, the 50- to 100-year long-term goals and Vegetation Properly Functioning Condition criteria.

Greater Curlew Valley Area Scale:

Vegetation cover types and sagebrush canopy cover data for the GCVA, compiled by Gardner (1997), and information from the Draft Curlew National Grassland and Surrounding Area Properly Functioning Condition (PFC) Assessment, compiled by the Forest Service (1998), were used for broad scale analysis of changes in sagebrush canopy cover defined in each alternative.

Curlew National Grasslands Scale:

The Grassland scale includes approximately 47,600 acres of land within the boundaries of the Curlew National Grassland administered by the Caribou National Forest. Information from Prevedel's 1997 GIS sagebrush canopy cover assessment, Habitat Types of the Curlew National Grasslands, Idaho (Collins and Harper, 1982), and the Forest Service PFC assessment (1998) were used for sagebrush canopy cover analysis at the landscape scale. Approximately 45,150 acres on the Grassland are considered successional to sagebrush. Existing sagebrush species on the Grassland are discussed in Chapter 3.

Differences In The Data:

Gardner's 1997 vegetation cover type data for the GCVA divided sagebrush canopy cover into the following classes:

Grass, forbs and Agricultural land
Sagebrush in less than 10 percent canopy cover
Sagebrush in 11-25 percent canopy cover
Sagebrush in greater than 25 percent

Prevedel 's 1997 GIS assessment divided sagebrush canopy cover into the following classes:

Sagebrush in 0-5 percent canopy cover
Sagebrush in 6-15 percent canopy cover
Sagebrush in 15-25 percent canopy cover
Sagebrush in greater than 25 percent canopy cover

In order to compare alternatives in relationship to changes in sagebrush canopy cover at the Grassland and Greater Curlew Valley Area scales, a formula was used to proportion the data in the Gardner study to provide an estimation of canopy cover similar to Prevedel's GIS assessment. Based on this formula, approximately 87,800 sagebrush acres in the GCVA are estimated to have canopy cover in greater than 15 percent.

Sagebrush Succession:

Succession in sagebrush is a key factor when calculating changes in sagebrush canopy cover over time. Sagebrush reestablishment after treatment varies. Size and type of treatment, proximity to seed sources, climate, and soils influence the rate of reestablishment. Monitoring information from past treatments and information from fire effects studies (Blaisdell, *et al*, 1982;

Bunting, *et al*, 1987; Harniss and Murray, 1973; Bushey, 1986; IDT Field Notes, 2001) indicate treated sagebrush sites on the Grassland in 0-5 percent canopy cover reach 15 percent canopy cover in twenty to thirty years

1953 Photo (SCS 1-489-2)

1965 Photo (65-3)

A large area containing the Sheep Creek plots was plowed and drilled in 1950. The 1953 photo shows a good stand of crested wheatgrass. The 1965 photo shows a dense 40-inch tall stand of sagebrush with a good crested wheatgrass understory. The photos were taken of the same location just northeast of the plot area. The 1953 photo is courtesy of the Soil Conservation Service.

If left untreated, it is assumed all of the existing sagebrush acres in the 0-5 percent canopy cover class would move into the 6-15 percent sagebrush canopy cover class over a ten-year period. The same assumption applies to existing acres in the 6-15 percent canopy cover. Existing sagebrush acres in the 6-15 percent canopy cover class would move into the greater than 15 percent canopy cover class over the same ten-year period if left untreated. Wildfires are suppressed in all alternatives and were not considered in the analysis. However, wildfires will be considered as they occur to determine how they affect the goals, objectives, and outcomes in the Grassland Plan.

A Vegetation Dynamic Development Tool (VDDT) was used to calculate outcomes/changes on sagebrush canopy cover on the Grassland based on sagebrush succession and treatments proposed in each alternative. The model was not used for analysis of the changes in sagebrush canopy cover for the GCVA, because changes cannot be predicted on lands not administered by the Forest Service.

VDDT simulates successional pathways and examines the potential effects of disturbance agents on vegetation. It stochastically projects changes in vegetative composition over time as affected by natural and human-caused disturbances. VDDT is useful for building successional pathway diagrams and understanding the relationship between environmental variables. The sensitivity of the system to changes in alternative assumptions are also easily evaluated with VDDT. The model is designed to show relative changes between/among alternatives, not absolute outcomes. (See Appendix E for a complete discussion of the model and assumptions.)

Properly Functioning Condition:

The outcome of treatments on sagebrush canopy cover was compared to Vegetation Properly Functioning Condition (PFC) criteria for the sagebrush ecosystem. By comparing the existing condition, the ten-year outcome, and the long-term goals for sagebrush structure, composition, disturbance regime, and patterns against PFC criteria, an assessment can be made to determine if the alternative meets or trends toward a properly functioning condition. These assessments are expressed as either a "low" magnitude of departure from PFC criteria, a "moderate" magnitude of departure, or a "high" magnitude of departure. Table 4.3 displays the criteria required for a sagebrush ecosystem in a properly functioning condition at the landscape scale.

Table 4.3. Sagebrush Criteria for PFC at the Landscape Scale
(USDA-Forest Service, 1996)

PFC Criteria	Landscape Level
Structure	10% of acres in 0-5% sagebrush canopy cover. 50% of acres in 6-15% sagebrush canopy cover. 40% of acres in >15% sagebrush canopy cover. Less than 20% bare ground.
Composition	Big sagebrush is present on all but 0-5% of historic habitat.
Disturbance Regime	Fire has a lethal fire regime on an approximately 20- to 40-year return cycle.
Patterns	Patterns are within historical range.

Direct and Indirect Effects:

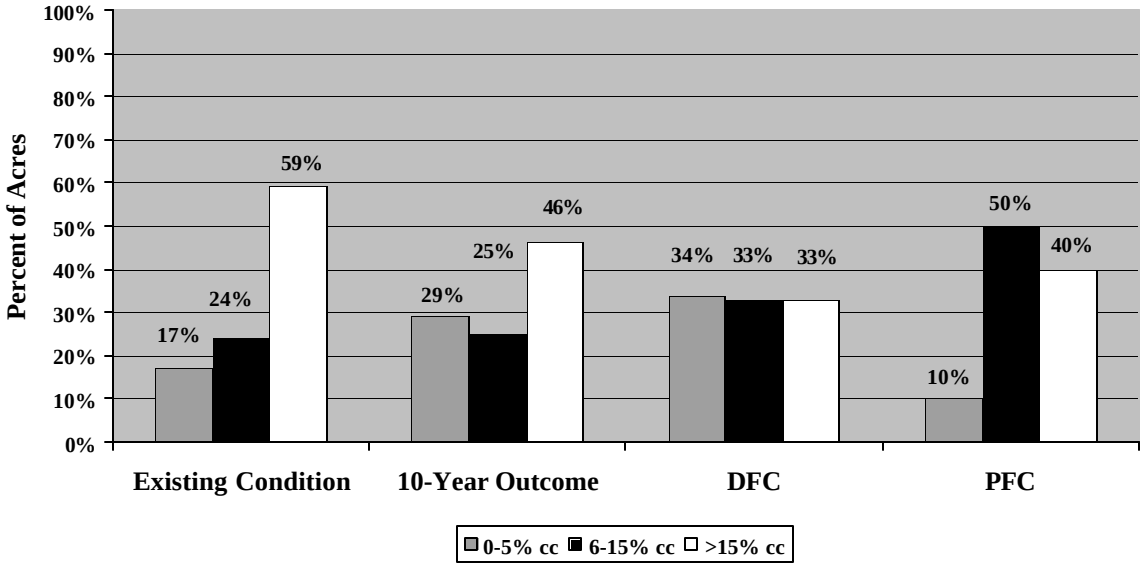
The effects the proposed treatments would have on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

Curlew National Grassland

Treatments and natural succession over the ten-year plan period would increase the number of sagebrush acres in the 0-5 percent canopy cover by 12 percent. A slight increase of 1 percent would occur in sagebrush acres in the 6-15 percent canopy cover class. By treating 18,750 acres in the greater than 15 percent canopy cover class, a reduction of 13 percent in the number of acres would occur in this canopy cover class.

Figure 4.1 shows the percent of acres in each sagebrush canopy cover class for the existing condition, at the end of the ten-year plan period, once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.1. Alternative A
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS Assessment and VDDT Model

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.4.

Table 4.4. Alternative A. Ten-Year VDDT Model Outcome of Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	29% of acres
6-15% canopy cover	25% of acres
16-25% canopy cover	18% of acres
>25% canopy cover	28% of acres

The ten-year projected outcome of treatments proposed would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require additional treatments on sagebrush acres in the greater than 15 percent sagebrush canopy cover to increase the 0-5 percent sagebrush canopy cover in subsequent decades.

This alternative does not achieve PFC for sagebrush structure or composition on the Grassland in the short term. It also does not trend toward PFC for sagebrush structure and composition in the long term. This alternative would restore the fire return interval to a twenty- to forty-year cycle. Patterns would continue to be influenced by land practices on private lands within the Grassland. Composition for the sagebrush cover type would also remain outside the PFC criteria on the Grassland and on surrounding private land.

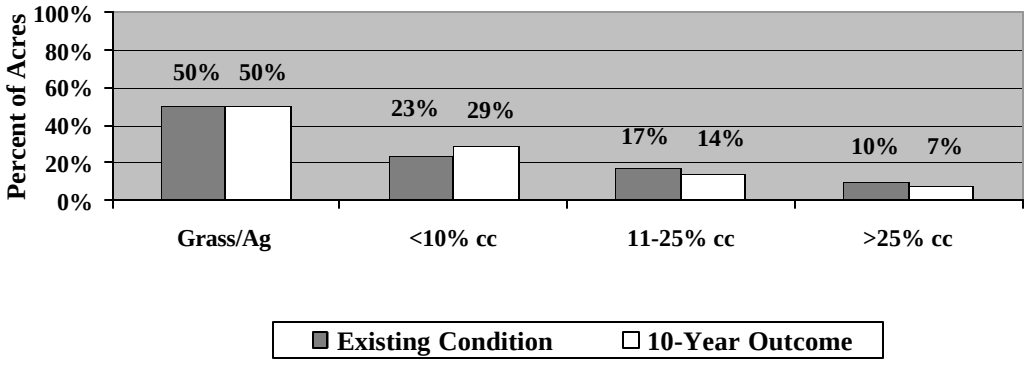
When disturbances occur, such as lethal fire, an increased risk of undesirable and non-native plant invasion may also occur. Shrubs that sprout after fire, such as threetip sagebrush and rabbitbrush, may increase and even become dominant. Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments as described in Chapter 3.

Continuing to manage the Grassland under Alternative A (No Action) would maintain the sagebrush system at a **moderate** to **high** magnitude of departure from the historic range of variation. This degree of departure could reduce the sagebrush system's resiliency and the ability to recover after disturbance.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 69,050 acres, a reduction of about 21 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush. Agricultural crop practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria. Figure 4.2 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.2. Alternative A
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on Proposed Treatments in this Alternative



All acres estimated due to differences in data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

A net loss of 5,870 acres in the greater than 15 percent sagebrush canopy cover over the next tenyears would be considered an irretrievable effect.

No irreversible effects have been identified.

Mountain Brush Management

Scope and Scale of Analysis:

Mountain brush was analyzed at the Greater Curlew Valley Area (GVCA) scale, a 524,000-acre area of private, BLM, Forest Service and State lands, and the 47,600-acre portion of the Curlew National Grassland under Forest Service Administration. The temporal scale of the analysis addresses the existing condition, the ten-year outcome and the 50- to 100-year long-term goals to compare alternatives

Greater Curlew Valley Area Scale:

Vegetation cover types for the GCVA, compiled by Gardner (1997), and information from the Draft Curlew National Grassland and Surrounding Area Properly Functioning Condition (PFC) Assessment, compiled by the Forest Service (1998), were used for broad scale and landscape scale analyses of changes in mountain brush defined in each alternative. Approximately 35,660 acres in the GCVA is considered successional to mountain brush.

Curlew National Grassland Scale:

The Grassland scale includes approximately 47,600 acres of land within the boundaries of the Curlew National Grassland administered by the Caribou National Forest. Information from Prevedel's 1997 GIS sagebrush canopy cover assessment, Habitat Types of the Curlew National Grassland, Idaho (Collins and Harper, 1982), and the Forest Service PFC assessment (1998) were used for the mountain brush analysis at the landscape scale. Approximately 1,360 acres on the Grassland are considered successional to mountain brush.

Properly Functioning Condition:

The outcome of treatments proposed in each alternative on mountain brush was compared to Vegetation Properly Functioning Condition (PFC) criteria for the mountain brush ecosystem. By comparing the existing condition, the 10-year outcome, and the long-term goals for mountain brush structure, composition, disturbance regime, and patterns against PFC criteria, an assessment can be made to determine if the alternative meets or trends toward a properly functioning condition. These assessments are expressed as either a "low" magnitude of departure from PFC criteria, a "moderate magnitude of departure, or a "high" magnitude of departure.

Table 4.5 displays the criteria required for a mountain brush ecosystem in a properly functioning condition at the landscape scale.

Table 4.5. Mountain Brush Criteria for PFC at the Grassland and GCVA Scales
(USDA-Forest Service, 1996)

PFC Criteria	GVCA and Grassland Scales	Existing Condition
Structure	Multiple vegetation layers with alternating vertical dominance.	Multiple vegetation layers low structural diversity on most sites and older age classes.
Composition	Balanced shrub/herbaceous understory components.	Balanced shrub/herbaceous understory components.
Disturbance Regime	Insect, disease and fire return intervals within 20-40 year cycles. Fire regime is mixed severity.	Fire intervals are beyond the 40-year cycle; most shrubs are older aged with dead branches. Wildfire would likely cause stand replacement
Patterns	Acreages and dispersion within historical ranges.	Acreages and dispersion are within historical ranges on the Grassland but are unknown in the Greater Curlew Valley Area.

Direct and Indirect Effects:

Alternative A does not identify any mountain brush acres for treatment. On the Grassland, mountain brush generally occurs on steeper, north-facing slopes that have never been cultivated (USDA Forest Service, 1998). All of the 1,360 mountain brush acres are considered to be in mid to late age classes.

Curlew National Grassland and Greater Curlew Valley Area

Patterns in the mountain brush cover type appear to be within the historical range of variation. Without fire disturbance or vegetation treatments, mountain brush will continue to mature into older age classes over time. At the end of the 10-year plan period, 100 percent of the mountain brush acres on the Grassland will be in the older age class.

The total acres that are successional to mountain brush within the Greater Curlew Valley Area (GVCA) are uncertain. Some mountain brush acres may be under cultivation. The remaining 35,660 acres of mountain brush acres appear to meet PFC criteria for structure and composition, reflecting multiple vegetation layers with alternating vertical dominance with a balance in the shrub/herbaceous component. Some species of mountain brush may not occur on all sites. Those species that are present appear to be in older age classes, based on size of shrubs and dead branches in the canopy.

Fire suppression has altered the disturbance regime on the mountain brush type with fewer, larger fires occurring outside the natural twenty- to forty-year return interval (USDA Forest Service, 1998). Mountain brush acres in the GVCA would continue to mature in the same manner as the mountain brush on the Grassland, if left untreated.

This alternative does not trend mountain brush acres toward PFC.

Continuing to manage the Grassland under Alternative A (No Action) would maintain the mountain brush sites at a **high** magnitude of departure from historical disturbance regimes and a **moderate** departure from succession (USDA Forest Service, 1998). These degrees of departure could potentially reduce the system's ability to recover after disturbances over the long-term.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

No irretrievable or irreversible effects have been identified for mountain brush in this alternative.

Vegetation Understory Composition

Scale of Analysis:

Changes in understory vegetation, based on vegetation treatments and livestock use proposed in each alternative, were analyzed at the Grassland scale.

Scope of Analysis:

The scope of the analysis focused on changes in native and non-native understories after treatments and in combination with livestock utilization levels proposed in each alternative.

Effects of the alternatives were assessed for the ten-year plan period and for long-term conditions.

The 1985 Forest Plan projected vegetation treatments on 18,750 acres over the decade to improve forage production for livestock grazing by removing overstory sagebrush in greater than 15 percent canopy cover class. Treatments generally occurred on sites already planted to non-native species, because of the higher site capabilities and the higher return on forage production. Natural regeneration has been the preferred restoration approach following prescribed fire treatments in crested wheatgrass. No prescribed fire has been applied to native ranges on the Grassland. Reseeding with a mix of crested wheatgrass and other introduced grasses and forbs has been the preferred restoration approach on bulbous bluegrass sites. No further treatments are planned for bulbous bluegrass or crested wheatgrass sites that have not already been analyzed in an environmental assessment.

Bulbous bluegrass dominates understories on approximately 5,200 acres. Crested wheatgrass dominates understories on approximately 30,400 acres. The remaining acres are dominated by native vegetation understories.

Without treatment, both bulbous bluegrass and crested wheatgrass sites are expected to continue to provide closed understory communities that out compete native understory species for moisture and nutrients. Limited moisture in the soil surface constrains native herbaceous species and re-establishment occurs slowly, if at all. Sagebrush and rabbitbrush are capable of re-establishing because their deep root systems draw water from the surface as well as the soil beyond the rooting depth of forbs and grasses. As a result, the density of sagebrush and rabbitbrush can increase on these sites.

A number of research projects indicate management alone will not improve the understory community on sites that have been drastically modified from native conditions (Harrison, *et al*., 1994). On these sites, natural successional pathways have been altered. As a result, consideration must be given to existing vegetation and conditions in planning vegetation objectives and treatments.

Individual plants or stands of cheatgrass can be found on disturbed sites, including roadways, on the Grassland. Sites that have cheatgrass or other non-desirable or noxious plants present that would invade the treatment area after fire should be closely evaluated prior to treatment.

Direct and Indirect Effects:

Under current management, bulbous bluegrass and crested wheatgrass sites would not noticeably change the existing plant composition in understory vegetation. Bulbous bluegrass and crested wheatgrass may actually move into disturbed sites or areas of excessively bare soil if these conditions occur. Both species are quick to germinate if moisture is available. Both of these plants have formed stable communities in relative equilibrium to the environmental conditions.

Prescribed fire treatments on 18,750 acres would be used to treat sites where sagebrush canopy cover is greater than 15 percent. Crested wheatgrass sites generally show no decrease in production until sagebrush canopy cover reaches greater than 15 percent canopy cover. By opening or removing sagebrush canopy cover, forage production on crested wheatgrass sites could increase substantially, in some cases almost three to twenty times higher than native plant communities (Kindschy, 1994). Although crested wheatgrass communities could provide more residual cover if grazed at lower use levels, biodiversity would be limited to grass and forbs species that are capable of invading these closed communities. It is unlikely understory diversity would change after treatment. Natural regeneration on these sites would encourage crested wheatgrass to reestablish after treatment.

On bulbous bluegrass sites, prescribed fire treatments proposed in this alternative would not change the plant composition in the understory. Removing the sagebrush overstory by burning would not disturb the dominant bulbous bluegrass understory, because it can regenerate from bulbs protected in the soil. Bulbous bluegrass could increase in vigor without the competition of the shrub layer. These sites would continue to support bulbous bluegrass in the understory.

During heavy precipitation years, bulbous bluegrass can grow to ten to fourteen inches. In dry years, growth is generally six inches or less. Bulbous bluegrass dries quickly and dies back early in the year, particularly if it is frozen after it breaks dormancy in the spring. These sites would

not provide the biodiversity needed for a productive, functioning shrub-steppe community, nor would they provide effective cover for ground-nesting birds. Although forage production is dependent on spring rainfall, on average, these sites generally produce between 300 to 500 pounds of forage per acre, much less than natives or other desirable introduced species. Bulbous bluegrass out competes native plants for moisture and nutrients, preventing them from re-establishing.

Livestock utilization levels would be maintained at 60 percent in this alternative for all vegetation. On sites dominated by introduced species, mainly bulbous bluegrass and crested wheatgrass, grazing at this utilization level would result in a lack of residual cover and litter leading which could lead to lower watershed conditions. No expected change would occur in understory composition, because both of these species are highly competitive on sites where they have adapted, and they evolved under heavy grazing pressure (Harrison, 1996).

On native sites, continued heavy use would result in a decrease in understory production and a subsequent increase in overstory shrub cover due to the loss of competition for surface moisture that would also lead to a change in composition as the desirable, more palatable plants are eaten first. More early seral plants, more annuals and more bare ground would likely occur. Due to the lack of residual vegetation and litter lower watershed conditions would be expected as ground cover decreases.

In riparian zones, a 60 percent livestock utilization level on native plants would lead to degradation of the site with a change in composition to plants more resistant to grazing, including early seral plants and fewer deep-rooted plants. Negative effects on stream stability and its "proper functioning" could be expected.

This alternative does not provide an opportunity to improve diversity in the understory on bulbous bluegrass sites. Approximately 5,200 acres of bulbous bluegrass will remain untreated during the 10-year plan period. Understory diversity will most likely remain unchanged. Forage production on these acres will remain low. These sites will not provide benefits to ground-nesting birds.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of forage on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with them could also be causing irretrievable effects yet to be understood and quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances have been altered. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation reestablishes.

Wildlife Habitat Management

Scope and Scale of Analysis:

Direct, indirect, and cumulative effects were analyzed at the Grassland and Greater Curlew Valley Area scales. The effects are based on predicted changes in vegetation at the end of the ten-year plan period.

The wildlife analysis discloses effects on Grassland management indicator species (MIS) and species at risk (SAR), including both sagebrush and riparian-associated species. Of the threatened, endangered, candidate and sensitive (TES) wildlife species for the Caribou National Forest, the Columbian sharp-tailed grouse is the only one known to occupy the area yearlong (See Chapter 3).

Marginally suitable habitat for Ute ladies'-tresses (*Spiranthes diluvialis*), a threatened plant, was identified in 1999 surveys; however, the likelihood of the species occurring here is considered very low based on the lack of indicators for good habitat, i.e. large, active floodplains or low densities of competing vegetation. In Idaho, the species is only known to occur along the South Fork of the Snake River between Palisades Dam and the confluence with the Henry's Fork. Numerous surveys have been done throughout Idaho since 1997. None of the alternatives are expected to have any effect on this species.

Bald eagles may occasionally use the Stone Reservoir area during the winter although there are no records of use. None of the alternatives would have any effect on the suitability of the area to be used by bald eagles. No big game winter range has been identified on the Grasslands. Much of the reservoir is frozen in the winter, limiting access to fish and foraging habitat. No changes in fish populations in the Reservoir are expected and no roost stands have been identified. None of the alternatives is expected to affect those types of habitats.

Other potential federally endangered, candidate, and sensitive species include the Lynx, gray wolf, and yellow-billed cuckoo. The Biological Assessment and Biological Evaluation in Appendix J addresses these species, their distribution, and available habitats on the Grassland and determine viability for the selected alternative.

Columbian sharp-tailed grouse are habitat generalists and populations are increasing in Idaho. Apa (1998) concluded that Columbian sharp-tailed grouse on the Curlew are habitat generalists and can adapt to many different habitats. As a result, they are easier and less controversial to manage habitat for than sage grouse. The main factors leading to population declines in other parts of this species range are the loss and/or degradation of native grasslands and shrub-steppe habitats Currently, the Idaho Department of Fish and Game is capturing Columbian sharp-tail grouse on the Grassland and transplanting them to other areas to augment other populations. . Effects on vegetative cover, provided through shrub overstory or residual vegetation, such as

grasses, and understory diversity of grasses and forbs will be analyzed to compare the effects of the alternatives on sharp-tailed grouse. Columbian sharp-tailed grouse and other sensitive species are addressed in the Biological Evaluation.

Viability assessments incorporate four levels of analysis (USFS 1999). The first level, bioregional assessments, assesses ecological sustainability over a large area. The Grassland has not been included in any bioregional assessments. While not considered a bioregional assessment, a Vegetation Properly Functioning Condition Assessment has been completed for the Grassland. The second level uses a coarse-filter approach to describe ecological conditions needed to maintain or restore viability for the majority of native species and communities. Shrub riparian and sagebrush-associated management indicator species and species-at-risk were analyzed using this approach. The third level uses a fine-filter approach for species that are not adequately addressed at the coarse-filter level (e.g. species that may have more specific habitat needs, such as threatened, endangered and sensitive species). In this analysis, sage grouse are addressed at the fine-filter level. The fourth level incorporates monitoring, which is essential to maintain viable populations and species (USFS, 1999).

Viability analysis for fine-filter species (threatened, endangered and sensitive species and species-at-risk) includes several steps; (1) identify species at risk, (2) identify life history traits for these species, (3) identify risk factors facing these species, (4) group species based on habitat needs, common risk factors etc (5) develop conservation measures, (6) integrate into alternatives and (7) effects analyses. Steps 1-6 are found in the wildlife section of Chapter 3 and alternative descriptions in Chapter 2. A description of the process used is found in the Wildlife Process Paper.

All species-at-risk on the Grassland are ranked G4 or G5[1] by the Natural Heritage Program and Conservation Data Center. This means that while they are of concern in the state, they are secure globally. Because this is the case, these species will be grouped by habitat use or other risk factors. Most of the species have been grouped into habitat associations; riparian shrub, sagebrush with canopy cover greater than 15 percent and sagebrush with canopy cover of 0-5 percent. While sagebrush overstory is the major division, effects on understory grasses and forbs are also important. Effects of patch size and connectivity are discussed under the "Effects on Sagebrush Habitat" section. Two of the species, the black-billed magpie and loggerhead shrike are not tied to specific habitats for breeding or foraging and show no direct relationship to the effects of vegetation treatments or livestock grazing. Neither is currently listed in the Region 4 Viability Spreadsheet (May 10, 2000), and will be dropped from further consideration.

The pallid and Townsends big-eared bats are the exception to the habitat association groupings. Several researchers have found that bat distribution and local populations are highly dependent on available roosts (Perkins and Peterson, 1997). Bats readily use structures such as buildings, mines, caves, snags and stumps for daily roosts. Because day roosts are very limited on the Grassland, foraging habitat is the only habitat component that will be addressed here. There are no hibernacula, maternity colonies or large roost sites while Townsend's big-eared bats are

[1] **Ranking** uses a numerical system of "1" to "5" with a ranking of "1" being imperiled and a ranking of "5" being widespread, abundant and secure.

strongly associated with mines and caves. Evaluation for these two species will be based on predicted effects on prey populations as a result of vegetation treatments and livestock grazing (Idaho State Conservation Effort, 1995).

Table 4.6. Species-at-Risk Habitat Associations/Groupings

Riparian Shrub	Sagebrush canopy cover 0-5 percent	Sagebrush canopy cover greater than 15%	Effects on insect (prey) populations
Calliope hummingbird	Long-billed curlew	Pygmy rabbit	Pallid bat
Willow flycatcher	Short-eared owl		Townsends big-eared bat
MacGillvrays Warbler			
Scott's oriole			
Yuma myotis			

Several assumptions, based on best available data, have been made in the wildlife analysis of effects. These assumptions fall into five categories: general habitat, sagebrush habitat, connectivity and fragmentation of habitats, riparian habitat, and sage grouse viability.

General Wildlife Habitat

Habitat cannot be managed for all wildlife species at once. For every action that benefits one species, another species may be neutrally or adversely impacted (Page and Ritter, 1999).

Native vegetation provides the best habitat for native wildlife. Sage and sharp-tailed grouse have evolved in native communities with natural processes. When understory vegetation is converted to non-native, single species, habitat diversity is reduced and processes are changed which may reduce the diversity of wildlife using the area. The presence of non-native vegetation, such as crested wheatgrass, influences small mammal communities and population densities which impacts total diversity (Koehler and Anderson, 1991).

Sagebrush Habitat

Managing sagebrush steppe communities for sage grouse will also benefit other sagebrush obligates (IPIF, 2000). While sage grouse and most sagebrush associated species favor mid- to late-seral communities, early seral communities are important to other species.

A mosaic of open to moderate shrub densities of 5 percent to 20 percent canopy cover, with multiple age and height classes, is desired to provide habitat for sagebrush dependent, area-sensitive species (Paige and Ritter, 1999). Area-sensitive species are species that do not occur in smaller patches of habitat. It is assumed that the Properly Functioning Criteria for the sagebrush type would provide for most sagebrush-associated species over the greater Curlew Valley.

Long-billed curlews and short-eared owls are potentially at risk from trampling of nests and loss of cover from livestock grazing which may result in loss of eggs and nestlings. Livestock on-dates (April 16 and 25) overlap with the nesting season for both of these species. Effects from trampling do not vary by alternative (except Alternative D), but may occur in those pastures with

open sagebrush (0-5 percent) that are grazed May through mid-July. Vegetation treatments would not occur in suitable habitat for these species, but may result in an increase in habitat for these species over the short term (ten years).

The pygmy rabbit, which burrows in dense sagebrush, forages on grasses and forbs as well as sagebrush. Factors affecting pygmy rabbits include residual grasses and forbs in the understory. In addition, fragmentation (discussed under Effects on Sagebrush Habitat) and vegetation treatments affect suitability of habitats.

Fragmentation of habitats can affect pygmy rabbits because of the species' low capabilities for dispersal and an apparent reluctance to cross open habitat (McAllister, 1995; Weiss and Verts, 1984; Katzner and Parker, 1997).

Table 4.7. Risk Factors for Sagebrush Associated Species

SPECIES	RISK FACTORS
Short-eared owl	Moderate to heavy livestock grazing reduces vole populations, their primary prey [1]
Long-billed curlew	Nest in areas of short grass; possibly benefited by livestock grazing, if nests aren't trampled, and burning [1]
Columbian Sharp-tailed grouse	Conversion to non-native vegetation communities, invasion of annual non-native vegetation and heavy grazing by livestock [1*]
Sage grouse	Changes in vegetation (sagebrush overstory, residual grass cover and understory diversity) as a result of vegetation treatments and livestock grazing, weather and predation [2]
Pygmy rabbit	Changes in vegetation (sagebrush overstory, residual grass cover and understory diversity.) Fragmentation of habitat and conversion to non-native species [3]

1 Paige and Ritter 2000; *****sagebrush canopy cover is shown by alternative with the percent over 5% canopy cover, but the sharp-tailed grouse is a habitat generalist and studies show great differences in canopy cover used (in Apa 1998).
2 Connelly, *et al*, 2000.
3 R4 Species-at-risk table

Under each alternative, a table is provided that displays predicted changes in sagebrush canopy cover at the end of ten years. Sagebrush canopy cover is shown for the Grassland and the Greater Curlew Valley Area (GCVA). The GCVA is 41 percent private, 40 percent BLM, 9 percent Curlew National Grasslands and ten percent other (Gardner, *et al*., 1997).

Connectivity and Fragmentation of Habitats

Historical patch sizes were not estimated for the Vegetation Properly Functioning Condition analysis for the Grassland, because lands had been greatly modified at the time of acquisition. While fire frequency has been estimated in several studies, very little information is available on patch size as a result of wildfire. Knick and Rotenberry (1995) completed an analysis of the sage sparrow, a sagebrush obligate. The probability of species occurrence increased with sagebrush canopy cover and patch size. For this analysis, it has been assumed that 320 acres is the minimum patch size needed for sagebrush dependent species (Paige and Ritter, 1999). Larger species, such as sage grouse, need larger areas of adequately connected habitat to maintain populations (Paige and Ritter, 1999).

Larger treatment patches will result in larger patch sizes over the long-term, while small treatment patches will result in smaller patch sizes over time. Treatments of less than 320 acres may result in future patches that are too small to be functional for some species of wildlife. Large habitat patches typically support more species. These larger patches offer a greater variety of conditions. They also provide larger blocks of habitats as well as habitat for more individuals of the same species thereby reducing vulnerability of extinction (Hunter, 1996). How fragmentation affects a species depends on its ability to disperse.

A patch size analysis was done for the Curlew National Grassland (see Wildlife Process Paper for the process used). Based on this analysis it was found that there are nineteen patches of sagebrush canopy cover in greater than 16 percent canopy cover that are over 320 acres in size on the Grassland. Results of treatments are shown by alternative, but there are problems with this analysis: it does not differentiate between total kill treatments and thinning treatments; it does not account for succession and associated increase in canopy cover. This was done solely as a way to compare the alternatives; actual results would depend on site-specific project location and treatments. Because this analysis did not include the effects of succession over time, which resulted in an underestimation of what would actually occur at the end of the decade.

An analysis of fragmentation and connectivity was attempted by alternative. The intermingled nature of landownership patterns complicated the ability to address connectivity and fragmentation in a cohesive way, because vegetation can change with no notice from the private landowner. The Grassland is divided into three units that are separated from each other by private land. In addition each of the three units includes interspersed private land within them. Alternatives C, E, F, G, and H also include a buffer adjacent to private land in agricultural uses. This adjacency buffer was not analyzed, because it can change with adjacent land management activities. The need to implement the adjacency buffer would be analyzed at the site-specific level prior to treatments.

The analysis is based on mapped 1991 lek locations from a study done on the Grasslands (Apa, 1998). More recent lek data shows an increase in the number of documented leks. Various studies have shown leks move over time. (Gardner, 1997, and Mattise, 1995) For this reason, proposed actions in relation to lek locations will be analyzed at the site-specific level prior to management activities. The 1991 locations were used as the baseline for comparison of the alternatives.

The use of herbicides in some alternatives to treat sagebrush will follow label directions. Tebuthiuron, an herbicide used to treat sagebrush canopy density, has been found to have little potential to bioaccumulate as it is readily excreted. It is unlikely to cause reproduction effects or birth defects and is not carcinogenic. It has been found to practically non-toxic to birds and mammals (Information Ventures, 2001).

Small mammals are sensitive to habitat alterations and were evaluated on some Wyoming sites to determine the relationship between vegetative diversity and small mammal diversity and abundance (Olsen, Hansen, Whitson, and Johnson, 1994). They found that as sagebrush canopy cover decreased with tebuthiuron, understory grass production increased. Ground squirrels increased with decreased sagebrush canopy cover while the white-footed dear mouse was least

abundant in the heavy treatment areas. Overall, they found that the number of small mammal species was lowest in the untreated plot. Skeletons of sagebrush remain after treatment and provide perch sites for bird species and trap blowing snow, improving moisture availability for plant production. They also offer some physical protection from grazing for grasses and forbs (Olsen, Johnson, Whitson, and Johnson, 1994).

Riparian Habitats

Very little information is available on existing condition of riparian vegetation. In this analysis, it is assumed that non-functioning reaches are downcut and riparian vegetation is limited to the areas of the stream and the area immediately adjacent to the incised drainage. "Functioning-at-risk" stream reaches would be largely dominated by sedges and rushes with very little mature willow. The functioning reaches are expected to have a larger willow component, such as the one on Salyer Creek. Studies show a direct correlation between avian shrub-nesting species and shrub volume and height (Taylor and Littlefield, 1986 and Taylor, 1986).

It is not known what effect cowbirds are having on the productivity of riparian shrub-nesting birds. Some areas of the Grassland could be functioning as "population sinks[2]" due to the presence of cowbirds. More recent surveys (Sauder 1999 and 2000) in the Greater Curlew Valley Area have not documented large numbers of cowbirds. For this analysis, it is assumed that riparian width and forage utilization will influence riparian habitats. In general, areas with greater riparian cross section width and lower forage utilization rates will have a higher resource value for wildlife. These measures were used to assess effects on riparian-associated management indicator species and species-at-risk.

The major risk factors for these species include livestock grazing and resultant effects on willow riparian habitats, and the potential for cowbird parasitism. Of these species, the willow flycatcher has been identified as a common cowbird host and the MacGillivrays warbler as an uncommon host (Ehrlich, *et al.*, 1988). For the Yuma myotis, which forages over water, the main risk is vegetation alteration, which would affect the insect prey base. It is assumed that riparian habitats closer to proper functioning condition provide optimum insect habitat and provide the best foraging opportunities for species preying on insects.

All alternatives will have similar potential for cowbird parasitism; even if cows were removed from the Grassland, private lands within the Curlew Grassland and Greater Curlew Valley Area provide foraging habitat to maintain the presence of cowbirds. Since cowbirds can commute up to seven kilometers (4.3 miles) between foraging areas and habitats where they search for host nests (Robinson, *et al.*, 1992), those Grassland riparian species that are cowbird hosts are vulnerable to nest parasitism. Further effects analyses will focus on changes in riparian habitats, based on conservation measures identified in IPIF 2000 and expected changes in populations and distribution.

[2] A **population sink** is an area that in some way contributes to the decline in population growth.

Sage Grouse Viability

The 1985 Caribou National Forest Land and Resource Management Plan includes a guideline to use sage grouse guidelines from Braun, *et al.* (1977) in the development of site-specific recommendations for proposed sagebrush treatments. For this analysis, guidelines in Connelly, *et al*, (2000) were used. Connelly's guidelines are the most recent, peer-reviewed guidelines. In addition, Braun collaborated with Connelly, *et al*, in developing the new guidelines using more recent research. .

Although the guidelines contain a comprehensive set of recommendations, the following discussion compares only four of the guidelines with how well management direction in the alternative meets the guideline. The four guidelines were selected because they best represent sage grouse habitat requirements, including breeding habitat, which includes lek attendance, nesting, early brood-rearing, and winter habitat (Connelly, *et al.*, 2000), and more closely relate to public issues received during the scoping period. The selected guidelines incorporate sagebrush canopy cover, residual grasses, which provide cover for nesting, and forbs understory, which is important in the spring diet of adults and broods. It is assumed that those alternatives that best meet these four Guidelines will contribute to viable sage grouse populations in the Greater Curlew Valley area over the ten-year planning period.

Because of the site-specificity of many of the habitat guidelines, the overall, more programmatic guidelines were used to compare the effects of the alternatives on sage grouse habitat.

Exact numbers of sage grouse that would be lost or gained as a result of specific treatments cannot be determined. However, based on known habitat requirements and life histories, predictions are made on population trends resulting from treatments and the effects of treatments on habitat quality.

This analysis assumes sage grouse on the Grassland are a non-migratory population (A. Apa, pers. comm.).

Sage grouse habitats are not uniformly distributed. Nesting habitats have different requirements than brood-rearing habitat, both of which are different from winter habitat. All three need to be considered and provided for within the biological needs and constraints of the sage grouse. (For a discussion of the vegetation on the Grassland, see Chapter 3, Sagebrush Canopy Cover, Mountain Brush and Vegetation Understory.) Apa (1998) found that a diversity of sagebrush age structure and canopy cover classes are needed for nesting and brood-rearing.

Forage utilization and residual vegetation are important measures used to address affects on sage grouse productivity. Numerous studies have shown that increased grass height increases nest success by reducing predation (Wakkinen, 1990, Hanf, *et al.*, 1994, and Braun, 1995).

Connelly, *et al* (2000) calls for an average seven-inch residual vegetation understory height to provide cover during the nesting season. The guidelines further qualify this by recognizing that some sites will not be able to meet this guideline. Field surveys of five ungrazed fields in September, 2001 on the Grassland found that two of the fields sampled could not meet this

guideline even when ungrazed. This is a result of both grass species present and growth as a result of yearly variations in precipitation. As shown in Appendix I, half of the years from 1971-2000 had a "below average" amount of precipitation from May to August. It is assumed that lower livestock utilization levels will result in greater residual vegetation height, and alternatives are compared based on utilization levels proposed in each alternative.

One of the guidelines for sage grouse winter habitat restoration discourages prescribed burns over fifty hectares (124 acres). Most of the alternatives proposed treatment sizes that are greater than 124 acres. Only alternatives B and E propose prescribed burning, but all alternatives except D, propose bulbous bluegrass treatments. Larger treatment sizes were selected to maintain habitat patches of at least 320 acres over time, and for economic and livestock management reasons. None of the alternatives (except D) would meet this guideline.

Nelle, *et al* (2000) looked at twenty different aged burns, ranging from wildfires from the 1960's to prescribed fire from the 1990's. Between six and fourteen years, sagebrush canopy cover had increased 8 percent; total shrub cover was at 16 percent. Nelle noted the following characteristics of these particular sites compared to unburned sites:

Table 4.8. Comparison of Six- to Fourteen-Year Old Burned Sites with Unburned Sites
(Nelle, et al, 2000)

Characteristic	Six- to Fourteen-Year Old Burned Sites Average per site	Unburned Sites Average per site
Grass cover	33%	34%
Litter	82%	83%
Miscellaneous forbs	15%	12%
Major forbs	15%	14%
Sagebrush height	49 cm	71 cm

Responses of vegetation to fire can vary depending on slope, topography, fire intensity, season of burn and post-burn climatic conditions. One-year old burns had many more beetles than all other age clusters. They also had more ants than three- to five-year old burns and unburned vegetation. There was no difference in the abundance of grasshoppers.

Baxter (1996) looked at the effects on a sagebrush community seventeen years after treatment with tebuthiuron (Spike 20P) at Albion, Idaho. He found that with a reduction in sagebrush canopy cover there was a decrease in bare ground, an increase in plant density, and a large increase in grass and forb production in the understory.

Table 4.9. Effects on Sagebrush Community Seventeen Years After Herbicide Treatment at Albion, Idaho

Characteristics	11% Sagebrush Canopy Cover	28% Sagebrush Canopy Cover
Bare Ground	15%	23%
Plant Density	35%	24%
Grass Production (lbs dry weight/acre)	495 lbs.	160 lbs.
Forb Production (lbs. dry weight/acre)	42 lbs.	22 lbs.

Sagebrush treatments have had varied results on sage grouse habitat use. Effects on lek attendance vary by distance of treatment from active leks (Wallestad, 1975), canopy cover removed by the treatment (Wallestad, 1975; Fischer, *et al*., 1996), and size of treatment (Braun and Beck, 1996). Other studies have found sagebrush treatments that eliminate sagebrush canopy cover have more effects on sage grouse use of the area than those treatment methods that retain a portion of the canopy cover (Swenson, Simmons and Eustace, 1987; Fisher, *et al*., 1996).

Effects on Aerial Insect (prey) Populations for Bat Species-at-Risk

It is assumed that the best habitats for insect (prey) populations will be those that are closest to vegetation properly functioning condition, because of vegetation diversity. There is no indication that foraging habitat is limiting for either the pallid or Townsend's big-eared bat, and no changes in population are expected under any alternative. See Summary of Effects by Alternative Table at the end of Chapter 2 for a comparison of how the alternatives meet riparian and sagebrush PFC.

Effects Common to All Alternatives

The "Guidelines to manage sage grouse populations and their habitats" (Connelly, *et al*., 2000,) propose a guideline to "avoid building powerlines and other tall structures providing perch sites for raptors within 3 kilometers of seasonal sage grouse range." About 18 miles of powerlines and 21 miles of tree rows currently exist on the Grassland, potentially making sage grouse more vulnerable to predation from raptors and other wildlife.

The Forest Service has a responsibility to plan and implement projects to minimize impacts on migratory birds. Treatments proposed in the alternatives provide a diversity of habitats in the sagebrush steppe. Prescribed fire treatments in sagebrush and on bulbous bluegrass sites occur in the fall to ensure a complete burn. Fall burning would avoid or prevent the loss of breeding bird nests with eggs or young.

Some stream channels have been altered to the point that recovery of a natural stream channel may no longer be achievable within a reasonable time. The historical potential natural vegetation communities would no longer be achievable on these sites due to a permanent change in the water table and eroded soil conditions.

While several of the alternatives incorporate a lek buffer zone that constrains vegetation treatments around known or occupied leks, these buffer zones may not be an appropriate tool for nesting habitat management. More recent studies in southeast Idaho found that sage grouse nest location was random with respect to lek location (Wakkinen, Reese, and Connelly, 1992). Nest site location is primarily determined by habitat components of taller sagebrush and grasses rather than proximity to lek location (Wakkinen, 1990). It is important to maintain suitable nesting, brood-rearing and winter habitat where it currently exists.

At a meeting between Forest Service and IDFG biologists (10/24/01) it was agreed that the lek buffer to protect nesting habitat should not apply to the Curlew National Grassland. The Curlew is highly fragmented and studies (Apa 1998) have found that hens travel large distances from the lek to nest sites. This change from the Guidelines has been incorporated into Alternative H.

Fences have been identified as a risk factor to sage grouse. Wooden posts provide perch sites for raptors, and there is a risk of injury when sage grouse fly into fences (Connelly, *et al*, 2000). Generally, fences with more than 3 wires and woven wire fences are of concern (Braun, 1998). Braun also identifies paths along fences as movement corridors for potential predators.

Approximately three hundred miles of fence currently exist on the Grasslands, including perimeter fences. These fences are four-strand barbed wire with a pattern of five steel posts to one wood post. It is not known if and what affect the current level of fencing is having on sage grouse on the Grassland. One report has been documented of sharp-tailed grouse flying into fences (D. Meints, IDFG Biologist, pers. comm.).

Past seedings of non-native species like crested wheatgrass and bulbous bluegrass have reduced understory diversity over much of the Grasslands. This then has the potential to affect the diet of pre-laying hens and broods.

Livestock grazing begins April 15 on the Curlew Valley allotment and April 25 on the Buist allotment. This is generally the same time of year that grouse are beginning to nest. However, sage grouse establish their nests under and within the densest sagebrush and residual vegetation available, areas typically unavailable to livestock. Cattle generally graze the interspaces where forage is accessible. Trampling by livestock occurs in the interspace between sagebrush, and has little effect on nest success. Timothy (pers. comm., 8/17/01) analyzed the grazing system and potential sage grouse nesting habitat and found that 74 percent of the suitable nesting habitat is not grazed up through the nesting season.

Tree row plantings have been used in the past to provide cover and habitat for introduced upland game birds – pheasants, and Hungarian partridge. While it is clear that these and other birds make significant use of shelterbelts during the breeding or winter seasons, no studies have examined the relative nesting success. Because tree rows are edge-habitats in largely agricultural landscapes, they are likely to provide easy nest access for avian and mammalian nest predators, and to the brood-parasitic cowbird (Dobkin, 1992). Farmlands provide food and habitat for a wide variety of predators, including corvids, gulls, foxes, coyotes and skunks (Rodenhouse, *et al.*, 1995). Some suggest existing tree rows may provide denning, nesting, and roosting sites for predators as well as upland game birds. It is not known if tree rows on the Grassland are

providing nesting and roosting sites for predators. Idaho Department of Fish and Game and USDA Wildlife Services are currently analyzing the effects of mammalian and avian predators.

ALTERNATIVE A

Direct and Indirect Effects:

About 95 percent of Grassland vegetation consists of sagebrush communities. Vegetation treatments that alter vegetation structure or composition can affect wildlife species that depend on sagebrush habitat. (See Sagebrush Canopy Cover Section in this alternative discussion.) A Vegetation Dynamic Development Tool was used to model changes in sagebrush canopy cover as a result of treatments proposed in each alternative. (See Appendix E for a discussion of the model.) Results of the model are used to discuss the effects on sagebrush habitats on the Grassland. Lek buffer zones proposed in this alternative were not considered in the model, because the model did not have the capability to remove them from the proposed treatments. A separate analysis was completed to show the differences between alternatives and is displayed here.

Effects on Sagebrush Habitat

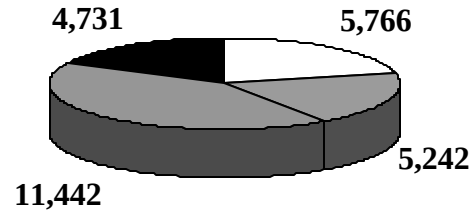
Alternative A incorporates a 1.9-mile buffer, identified in the 1985 Forest Plan, around known lek locations. No vegetation treatments would be permitted within the lek buffer zone. Vegetation treatments in relationship to lek locations would be analyzed at the site-specific level prior to treatment.

Table 4.10. Alternative A. Changes in Percentage of Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	29%	50%	50%
6-15% cc	24%	25%	23%	29%
16-24% cc	42%	18%	17%	14%
>25%	17%	28%	10%	7%

Figure 4.3 displays the existing distribution of sagebrush canopy cover classes outside the 1.9-mile buffer of known lek locations.

Figure 4.3. Alternative A
Acres in Sagebrush Canopy Cover Classes
Outside of 1.9-mile Lek Buffer
Year 0

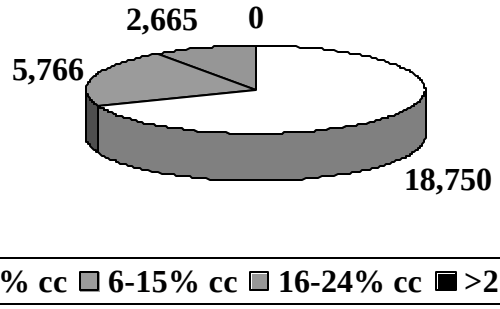


Lek buffer zones in this alternative encompass about 57 percent of the Grassland acres. No treatment would occur within these lek buffer zones.

About 43 percent of Grassland acres would be available for treatment outside of the lek buffer zones. Because of the constraint of the lek buffer zone in this alternative, treatments could not be implemented as proposed. If 18,750 acres were treated outside of the 1.9-mile lek buffer zone as proposed, all existing sagebrush acres in the greater than 25 percent canopy cover class would be treated; all of the existing sagebrush acres in the 16-24 percent canopy cover class would be treated; and about 2,577 existing acres in the 6-15 percent canopy cover class would be treated by the end of the decade.

Figure 4.4 displays an estimate of the results of treatments on canopy cover classes in Year 10 on the acres outside of buffer zones. The graph does not represent true on-the-ground conditions in Year 10. It is used only as a tool to show differences between alternatives.

Figure 4.4. Alternative A
Sagebrush Canopy Cover Classes
Outside of 1.9-mile Lek Buffer
Year 10



Sagebrush acres within the lek buffer zones would be the only acres remaining in the greater than 15 percent canopy cover. Connectivity refers both to the abundance and spatial patterns of habitat and to the ability of wildlife to move from patch to patch of similar habitats. Connectivity would continue to improve inside the lek buffer zones; however, as sagebrush canopy cover begins to increase over time, grasses and forbs in the understory would begin to decline in diversity and production as sagebrush absorbs more nutrients and water. This would result in the loss of important habitat components and could make these areas unsuitable over the long term. Connectivity for the remaining area of the Grassland outside of the buffer zones would decrease for species using denser sagebrush.

In the case of the five sagebrush-associated species-at-risk on the Grassland the birds are easily able to cross unsuitable habitat. For birds, proposed treatments in this alternative would not be a barrier. Habitat for less mobile species, such as the pygmy rabbit, would be lost for several decades or until sagebrush canopy cover reaches at least 16 percent. Large treatments would result in a lack of connectivity, an increase in unsuitable habitats and could increase vulnerability to predation due to a lack of cover.

Treatments would be scattered across the three sections of the Grassland outside of the lek buffers. Fragmentation and lack of connectivity would become an issue outside the lek buffer zones, because most of the early seral communities would occur outside of these areas in patches of various sizes.

Although this alternative proposes to treat vegetation in patches of at least 500 acres or more, because of the 1.9-mile lek buffer, it is doubtful this would occur. Historic treatment size has been larger, ranging generally from 800 to 1,000 acres. Larger treatment sizes, greater than 1,000 acres, may have a greater effect on sage grouse than smaller treatment sizes, because of the lack of contiguous cover (D. Meints, Wildlife Biologist, Idaho Fish and Game, pers. comm.). When large expanses of sagebrush canopy cover are removed during treatment, production and survival of sage grouse may decline, because quality nesting habitat is removed.

Less dense sagebrush canopy cover can increase vulnerability of broods and nesting hens to predation and inclement weather conditions. Those species that use more open shrub stands or grasslands, such as long-billed curlew and short-eared owl, may benefit from larger treatment sizes, because of the larger extent of suitable habitat.

Sharp-tailed grouse would not be as negatively impacted by large treatments as sagebrush obligates, like sage grouse. They are more adapted to and spend more time in less dense and more open sagebrush communities.

Sagebrush acres in patches of greater than 320 acres in the greater than 16 percent canopy cover could drop from nineteen patches to seven patches in this alternative.

Effects on Riparian Species

This alternative proposes to continue grazing riparian areas at 60 percent utilization on the green line. Since the width of the riparian zone is restricted to the green line, available habitat, regardless of the residual vegetation height, would be minimal. This livestock forage use level would leave less residual riparian vegetation than any of the other alternatives. As a result, it is expected that riparian-dependent species, including non-game songbirds and mammals, would be negatively impacted by limited cover for nesting and foraging. Sage and sharp-tailed grouse use riparian areas for late spring and summer brooding habitat because of succulent vegetation and insects that are available. Suitability for this use would be very limited under this alternative.

Stream reaches outside of riparian pastures or exclosures would continue to be impacted. Improvements in vegetation conditions would not be expected. No increase in willow riparian habitat would be expected in these reaches within the next ten years. Four species-at-risk, the calliope hummingbird, willow flycatcher, MacGillivray's warbler and Scott's oriole, are associated with tall shrub communities and would be negatively affected by the lack of willow riparian habitat. Three of the five species-at-risk, the calliope hummingbird, willow flycatcher and MacGillivrays warbler, have shown a negative response to livestock grazing, because of its effect on tall shrub communities (Bock, *et al*, 1993). Habitat for riparian associated species at risk and management indicator species would be maintained at current low levels over the ten-year plan period.

Table 4.11. Alternative A. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would be maintained at current low levels.
How well the alternative meets conservation measures	This alternative does not meet conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to remain at low levels and be poorly distributed across the Grasslands, due to the isolated areas of currently suitable habitat.

Effects on Sagebrush Species (except Sage grouse)

Treatments proposed in this alternative would affect the distribution of sagebrush canopy cover classes (See Sagebrush Canopy Cover Section for each alternative.) Although this distribution would not meet PFC criteria for the sagebrush type by Year 10, sagebrush acres would move to a more balanced pattern of canopy cover classes. As a result, those species using more open stands, such as the short-eared owl and long-billed curlew would see an increase in habitat in areas outside of the lek buffer zones. Species associated with denser canopy stands, such as pygmy rabbits, would have little available habitat outside lek buffer zones. Habitat connectivity would be limited for this species, because it generally does not move far from its burrow (Groves, *et al.*, 1997). However, the distribution of age classes of sagebrush would allow suitable habitat to be present over the long-term.

Livestock grazing in shrub-steppe habitats tends to increase shrub cover and reduce understory of palatable annuals and perennials by reducing the competition for surface soil moisture (Knight, 1994). Utilization levels affect residual vegetation height and cover for species nesting on the ground. Few studies are available that examine avian responses to livestock grazing. Some conclusions have been drawn, based on limited published information or on knowledge about effects on vegetation and habitat requirements of birds (Bock, *et al.*, 1993). The long-billed curlew and short-eared owl would show a negative response to livestock.

Upland livestock utilization levels would be set at 60 percent in this alternative for native and non-native vegetation. Residual vegetation at this utilization rate would not provide sufficient cover for most ground-nesting birds. This alternative and Alternative E provide the least residual vegetation of any of the alternatives.

Table 4.12. Alternative A. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	A 12% increase would be expected in suitable habitat over the Grassland, and a 6% increase over the GCVA based on sagebrush overstory. However, a 60% utilization level is predicted to be inadequate to maintain cover for voles. Populations of short-eared owls would be expected to remain at current levels.
Long-billed curlew	A 12% increase would be expected in suitable habitat over the Grassland, and a 6% increase over the GCVA based on sagebrush overstory. Utilization levels of 60% and vegetation treatments would result in increased areas of suitable habitat for nesting. Populations of long-billed curlew would be expected to increase above current levels.
Columbian Sharp-tailed grouse	Approximately 71% of sagebrush acres would remain in greater than 5% canopy cover. Burning would occur on existing crested wheatgrass sites and there should be no increase in non-native communities. Utilization levels of 60% will maintain current low levels of overhead nesting cover and would be expected to maintain current levels of nesting success. Populations of sharp-tailed grouse would be expected to remain at current levels.
Pygmy rabbit	A 13% decrease would be expected in suitable habitat over the Grassland, and a 7% decrease over the GCVA based on sagebrush overstory. Fragmentation would increase. The number of sagebrush patches in greater than 320 acres in denser stands would drop from 19 to 7. Burning would occur on existing crested wheatgrass sites and there should be no increase in non-native communities. Populations and distribution would be expected to decrease from the current levels.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative restrict habitat manipulation within 1.9 miles of an active lek based on direction in the 1985 Forest Plan.

Research biologists (Connelly, *et al*, 2000,) suggest that sagebrush in the greater than 15 percent canopy cover class is critical for the survival of sage grouse populations. A reduction in the greater than 15 percent canopy cover class could reduce sage grouse production and, consequently, a decline in population numbers could be expected. The desired future condition defined in this alternative would result in 34 percent of sagebrush acres in 0-5 percent canopy cover, about 33 percent in 6-15 percent canopy cover, and 33 percent in greater than 15 percent canopy cover. This distribution of sagebrush canopy cover would reduce sage grouse nesting habitat over the short-term.

Treatments in this alternative would reduce available nesting and brooding habitat for sage grouse. Losses would occur outside of the 1.9-mile lek buffer. A reduction in nesting habitat may result in decreased numbers of successfully nesting sage grouse and, therefore, decreased production. The degree of impact would depend on the size, timing, and location of treatments

relative to other disturbances, both spatially or temporally. If treatment areas are located in close proximity to each other or are conducted in relatively short time intervals, the impact on sage grouse would increase.

Bulbous bluegrass and crested wheatgrass sites generally provide few, if any, forbs species in the understory. Revegetation after treatment would occur by natural regeneration. If prescribed fire treatments occur on existing native vegetation sites, some improvement in understory vegetation could be expected. However, these acres would not provide optimum sage grouse habitat for at least twenty to twenty-five years or until sagebrush canopy cover reaches16 percent canopy cover. As the sagebrush canopy cover increases to 6-15 percent in ten to twenty years, it would provide habitat for sage grouse brood-rearing

Livestock grazing can affect sage grouse nesting if cattle have depleted the understory and the remaining residual vegetation is inadequate to provide cover. Utilization levels in this alternative would be the most likely to remove vegetation below the preferred level for nest cover (18 cm). This would be most critical in fall pastures that are grazed where conditions for fall and early spring regrowth are limited. The limited amount of residual cover would reduce nest success of those birds nesting in these areas.

Alternative A provides the fewest number of suitable acres for sage grouse nesting of any of the alternatives in the first decade. Sharp-tailed grouse would not be impacted as heavily as sage grouse, because sharp-tailed grouse are not as reliant on sagebrush for nesting.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

At the present time, disturbance during breeding does not appear to be a factor. Off-route travel is not believed to be affecting breeding activities (D. Meints, pers. comm.). Unlimited travel during breeding season could have the potential to disturb displaying and nesting grouse and reduce nesting success thereby decreasing population numbers.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative A for a discussion of potential erosion rates based on treatments in this alternative. See the Vegetation Understory section for a discussion on changes in understory composition and structure in relationship to proposed treatments in Alternative A.)

Prescribed fire treatments in this alternative could result in reduced soil moisture effectiveness and increased erosion until vegetation reestablishes. Natural regeneration would be used to

revegetate treated sites. On native vegetation sites, treatments could increase understory grass and forbs production until sagebrush reestablishes on the site and begins to out compete grasses and forbs for water and nutrients. On non-native sites, existing understory species would be expected to reestablish after treatment.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Over the ten-year plan period, a loss of thirteen percent of the sagebrush acres in the greater than 15 percent canopy cover on the Grassland would result in a reduction of available sage grouse winter habitat compared to existing conditions. With fewer acres in the greater than 15 percent canopy cover, winter survival of sage grouse could decline. It is unknown how important the Grassland is for wintering sage grouse.

Overall Findings on Compliance with Sage Grouse Guidelines

Alternative A would not meet the Sage Grouse Guidelines. Implementation would decrease the number of acres in greater than 15 percent canopy cover. Proposed utilization levels would not be expected to retain adequate residual vegetation. Treatments proposed would not result in understory improvement. This alternative would have the potential for disturbance to breeding and nesting birds from off-road vehicle travel.

Effects of Tree Rows at End of Decade

A stable twenty-one miles of tree rows may not change the population trend of sage grouse or other sagebrush associated or tree-nesting species. Since sage and sharp-tailed grouse did not evolve with large deciduous trees, it is possible that the influences of such plantings may impact populations. Tree rows may also serve as "population sinks" for breeding songbirds, as cowbirds are abundant in the area.

A GIS query compared successful and unsuccessful sage grouse nests in relation to existing tree rows or power lines. The data point size was small. Tall perching structures on adjacent and interspersed private land were not mapped. By evaluating only those nests on the Grassland, no correlation could be drawn between nest success and distance to tree rows or power lines.

Cumulative Effects:

See page 4-197 and 4-200.

Irretrievable/Irreversible Effects:

Managing riparian green lines at 60 percent utilization levels would be an irretrievable loss of potential late summer brooding habitat for sage and sharp-tailed grouse and nesting/summer range for neotropical migrants.

An irretrievable loss of 18,750 acres of sage grouse nesting habitat would result from prescribed fire treatments in this alternative until sagebrush on treated sites achieve at least 16 percent canopy cover or until sage grouse resume nesting activities on treated sites.

An irretrievable loss in native understory and processes is resulting in a loss of diet diversity and potential nest sites and security. Other effects, such as impacts to insect populations, are unknown. The loss of optimal habitat may be having unquantified effects on sage grouse populations.

●Economic and Social Values

Social and Economic Consequences

The impacts of the alternatives are projected based on Forest Service expenditures and the estimated outputs in three program areas of Grassland management: recreation, range, wildlife and fish. The output levels used for this analysis represent the projected ten-year average for the planning period. Resource specialists have provided estimates based on the best available information and professional judgment. Additionally, because complete information about the area economies was not available, it was necessary to make a number of assumptions in order to conduct the analysis. Where pertinent to the discussion of effects, some of these assumptions are explained below. More information about the assumptions and processes used to conduct the analysis is provided in Appendix B.

The economic sections of the analysis consider the potential effects to market related goods and services (primarily recreation) that occur on the Grassland, for which monetary values are available, and for which analysis tools are generally accepted. Therefore, the analysis considers the possible economic impacts of alternatives to livestock grazing, and recreation. It does not consider many other "amenity" values for which monetary values and analysis techniques are less clear. For instance, the value of a municipal watershed, or the value of the scenic backdrop to a recreation experience or to adjoining private real estate, or the value of habitat that supports a variety of species. While the Forest Service recognizes the tremendous value of these kinds of items, analysis methods to quantify them in an economic analysis are not readily available or agreed upon. These types of values are described and considered qualitatively within this analysis.

Scope and Scale of Analysis: Oneida County is the scale of the economic and social analysis. The analysis predicts changes over the ten-year plan period. In addition some comparisons are made between Oneida County, the State of Idaho, and the United States.

Economic Impact Analysis

Financial Efficiency

Financial efficiency is a comparison of those costs and revenues that can be quantified in terms of actual dollars spent or received within the project area by the Forest Service. When considering quantitative issues, financial efficiency analysis offers a consistent measure in dollars for comparison of alternatives. This type of analysis does not account for non-market benefits, opportunity costs, individual values, or other values, benefits, and costs that are not easily quantifiable. This is not to imply that such values are not significant or important – but to recognize that non-market values are difficult to represent with appropriate dollar figures. The values not included in this part of the analysis are often at the center of disagreements and the interest people have in forest resource projects. Therefore, financial efficiency should not be viewed as a complete answer but as one tool decision makers use to gain information about resources, alternatives, and trade-offs between costs and benefits.

Table 4.13 displays the Forest Service costs and revenues estimated for each alternative over the planning horizon, fifty years. Forest Service budgets have been held constant over the planning horizon. Specific allocation differences between resource programs were made based on each alternative's emphasizes. Based on estimated resource outputs by alternative, the level of revenues to the Forest Service change by alternative. For specific information about the analysis, refer to Appendix B.

Table 4.13. Forest Service Financial Costs and Revenues Estimated by Alternatives

	Alternatives								
Value	**Current**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Present Value, Million of Dollars								
Forest Service Revenue	0.608	0.720	0.619	0.420	0.000	0.589	0.539	0.520	0.597
Forest Service Costs	-6.084	-6.524	-6.264	-5.969	-5.079	-6.883	-7.049	-6.354	-6.935
Total Value	-5.475	-5.804	-5.645	-5.550	-5.079	-6.294	-6.511	-5.834	-6.338

Source: QuickSilver, 2001.

Because the analysis includes only revenues collected by the Forest Service, grazing fees are the only revenues included in Table 4.13. Alternative A has the highest level of revenue with other alternatives falling into the same ranking as they do for total head month outputs. Financially, all alternatives have negative total values, spending more dollars than collected. Alternative D has the highest total value, although still negative, due to the limited management activity that would occur if alternative D were selected. Several of the alternatives emphasize management and stewardship of resources that do not result in outputs for which the Forest Service receives revenues. Alternatives E, H, and F have the lowest total revenue due to the high level of management and restoration activities and the lower level of grazing outputs. These alternatives emphasize stewardship activities and other management activities not directly related to commodity outputs, but outputs associated with improved habitat, soil stabilization, water quality and other resource protection. These types of outputs or benefits have not been included in this portion of the analysis, but are considered in the economic efficiency analysis.

The largest cost over the analysis period was the annual administration of the grazing program. Other differences include the cost of treating bulbous bluegrass and whether native seed mixes were used for restoration on treated sites. The least expensive treatment used in alternatives is

prescribed fire and natural regeneration. Herbicide treatments and natural regeneration on treated sites are intermediate in expense.

Economic Efficiency

Efficiency analysis seeks to measure all of the costs and benefits associated with a given planning alternative and summarizes them in the form of a "Present Net Value" (PNV). In deriving PNV figures, costs are subtracted from benefits to yield a net value. "Future values" (i.e., benefits received in the future) are discounted using an appropriate discount rate to obtain a "present value." The PNV of a given alternative is the discounted sum of all benefits minus the sum of all costs associated with that alternative. Following Forest Service standard procedures, a four percent discount rate is used. While the question of the appropriate discount rate to use is debatable, the four percent level is consistent with what is commonly used in evaluation of public policy.

A major component of PNV is comprised of what economists term producer and consumer surplus. Producer surplus refers to the amount of money a company receives from sales over and above its costs of production and is analogous to the concept of profits. Consumer surplus, on the other hand, refers to the amount of benefit a person receives from a good minus the cost of purchasing it. This benefit is commonly conceived as the maximum amount a person would be willing to pay for the good minus its actual price and is referred to as net willingness to pay (WTP). Where goods are traded in the market place, such as in the case of timber, consumer and producer surplus can be calculated after estimating the demand and supply schedules for the given market good. For goods that are not traded, such as forest recreation and tourism or environmental preservation, more elaborate (and often more tenuous) techniques must be used. Since PNV estimates attempt to condense a large amount of information into a single value, they must be used with caution. A complete accounting of all the costs and benefits (both traded and non-market) is a practical impossibility, and one must be aware of what is and is not included in the PNV estimate.

In the following analysis, we have provided quantitative PNV estimates are provided for the Curlew Grassland alternatives including grazing and recreation and tourism as valued through the 1990 RPA program. The PNV of nonuse (or “passive use”) values are not quantified. These are mainly comprised of existence, bequest, option and quasi-option values. Existence values refer to the amount an individual would be willing to pay to preserve an old-growth forest stand, for example, even if they had no intention of ever visiting it. Bequest value refers to the amount individuals would be willing to pay to preserve the old-growth stand for the enjoyment of their children or future generations. Option value refers to the premium risk-adverse individuals would be willing to pay in excess of their expected surplus to ensure the future availability of the old-growth stand in an environment of uncertainty. Quasi-option value arises because there is uncertainty about the future value of a natural resource. Information about the value of the resource is revealed only with the passage of time.

While the passive use values associated with the Grassland as a whole are no doubt considerable, they are extremely difficult to accurately measure, particularly on the a per acre basis, which would be needed in order to make a comparison among alternatives. Instead these values are

qualitatively discussed below in the social impact analysis section. Additional assumptions and the derivation concerning the PNV estimates by alternative are included in Appendix B.

PNV estimates over the next fifty years by alternative are presented in Table 4.14 and discussed by resource below with specific details included in Appendix B. As in the cost and revenue analysis above, the cost and benefits are linked to resource outputs by alternative. A significant comparison between the PNV analysis and the previous cost and revenue analysis is that all PNVs are positive. This highlights that much of the benefit created by Forest Service system lands and management is not captured in fees or revenues.

Recreation outputs were assigned a dollar value for the PNV and the market value for grazing, rather than the Forest Service fee, was used for head month value. Alternative A has the highest PNV due to the moderate levels of all resource outputs estimated to be produced with full implementation of this alternative. Alterative D has the lowest PNV, without a grazing program the benefits for this alternative are limited to recreation activities.

Table 4.14. Forest Service Present Net Value Estimated by Alternative

	Alternatives								
Value	**Current**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Present Value, Million of Dollars								
Forest Service Benefits	20.314	20.946	20.374	19.161	16.792	20.207	19.832	19.726	20.165
Forest Service Costs	-6.084	-6.524	-6.264	-5.969	-5.079	-6.883	-7.049	-6.354	-6.935
Present Net Value	14.230	14.422	14.110	13.192	11.713	13.324	12.783	13.372	13.229

Source: QuickSilver, 2001.

The following is a brief discussion of the resource inputs into the PNV calculation. These total values were calculated for the next fifty years, with the future revenues discounted at four percent using 2001 as a base year. Full implementation of the given alternative was assumed to begin in 2002.

Recreation and Tourism. This PNV analysis used the RPA values for Region 4 recreation and tourism activities highlighted below to estimate values. Recreation and tourism use was predicted to be stable throughout the grassland over the planning horizon with the exception of mechanized travel. Alternatives C, D, F, G, and H account for fewer outputs related to mechanized travel due to changes in travel management on the Grassland.

Table 4.15. PNV Value of Recreation Activities

Activity	RPA value for RVD
Developed Recreation	$5.62
Mechanized Travel	$7.92
Hiking	$10.82
Hunting	$39.93
Fishing	$53.23
Wildlife Viewing	$54.35

Source: 1990 RPA

Grazing. This PNV analysis used the RPA values for Region 4 grazing of $6.27 per head month as an estimate of the total value. It was assumed that grazing would continue at the mid-point

between each alternative high and low head month output, and then remain constant throughout the fifty-year analysis time frame.

Issue Statements: The cost of maintaining head-months on the Curlew Grassland should be justified by monetary benefits gained from providing head-months. The cost of bulbous bluegrass treatments should be justified by the monetary benefit.

The above analyses highlight the total costs and benefits of management of the Grassland over the ten-year planning horizon. The analyses included all resources and considered the total budget of the Grassland rather than specific grazing program concerns. The issue statements specifically address management of the grazing program. Table 4.16 highlights the grazing portions of the data used in the PNV analysis presented earlier to compare alternatives and address these issue statements.

Table 4.16 is a summary of grazing costs, revenues, and benefits over the entire planning horizon. Alternative E has the highest cost because it proposes to use a wide variety of treatment methods. Alternatives F and H both treat similar acres for about the same total cost, but Alternative H maintains a level of head months similar to the current situation while Alternative F reduces head months by about 2,000. Alternative A has the largest number of head months and treats the highest number of acres using burning, the least expensive method. Administrative costs for each alternative are based on the current situation of managing permits and monitoring pasture conditions. Alternatives F, G and H require additional monitoring and activity with permit administration so the administrative costs for these alternatives are slightly higher.

When comparing the administration cost only to the fees collected by the Forest Service, none of the collect enough fees to cover the administrative costs of the grazing program. But the total value – or market value to the permittees of the grazing program – of all alternatives, except Alternative D, is greater than the annual grazing administrative costs.

A comparison of the total costs of range and habitat improvements, as well as program administration, shows that all of the alternatives would cost more than the monetary benefits. What this analysis does not display are those benefits created by each alternative through treatments for other resource programs for which fees or revenues are not collected or accounted for. These benefits include improved or maintenance of water quality and quantity through riparian restoration and protection projects, increased habitat for bird species, increased lands seeded with native grasses, fire protection for those living around the grassland, and potential increases in watchable wildlife opportunities. The changes in these and other resources by alternative are described in each resource section of this document. While this analysis does not specify a value for these types of benefits – the process of selecting an alternative will balance these values and uses in order to best manage the ecosystem and still allow a variety of uses to occur.

Table 4.16. Estimated Annual Grazing Program Costs, Revenues, and Benefits by Alternative

	Alternatives								
	Current	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Average head months[1]	20,035	23,728	20,387	13,828	0	19,412	17,744	17,127	19,685
Treatment costs[2]									
Burning	$9,175	$46,875	$5,375	$0	$0	$19,250	$500	$0	$0
PoBu	$5,825	$0	$9,250	$3,750	$0	$6,250	$6,250	$6,250	$6,250
w/native seed	$7,992	$0	$13,690	$11,100	$0	$9,250	$18,500	$9,250	$9,250
w/non native seed	$5,000	$0	$7,400	$0	$0	$5,000	$0	$5,000	$5,000
Herbicide	$0	$0	$0	$7,500	$0	$22,500	$28,800	$7,500	$28,800
Fencing[4]	$0	$0	$0	$0	$0	$0	$0	$14,000	$5,000
Improvements[4]	$0	$0	$0	$750	$0	$0	$750	$0	$0
Fire protection	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000
Grazing administration	$20,000	$20,000	$20,000	$20,000	$5,000	$20,000	$35,000	$30,000	$35,000
TOTAL ANNUAL COST[3]	$207,992	$226,875	$215,715	$203,100	$165,000	$242,250	$249,800	$232,000	$249,300
Acres treated in decade	8,330	18,750	5,850	4,000	0	17,200	12,300	5,000	12,100
Total annual fees collected[4]	$27,047	$32,032	$27,522	$18,668	$0	$26,206	$23,954	$23,121	$26,575
TOTAL ANNUAL VALUE[5]	$125,616	$148,771	$127,826	$86,702	$0	$121,710	$111,255	$107,383	$123,425

1 Reflects average estimated head months per year
2 Reflects average total costs of treatments for each year for each alternative.
3 Reflects Estimated Total Annual Cost of each alternative.
4 Reflects current $1.35 per head month annual grazing fees paid by livestock permittees based on average head months in line 1 of this table. Fencing and range improvements are paid for by the permittees.
5 Reflects a fair market value of $6.27 per head month based on average head months in line 1 of this table.

Distribution Analysis

The following analysis and discussion examines the potential effects of alternatives on employment and labor income opportunities within the analysis area. In most cases the differences between the alternatives are relatively small, but the impact may be considerable to individual persons, families, or businesses. Within small communities, the loss of a single job may be very important, while the same impact at the county-level may be negligible.

The impacts of the alternatives are projected based on Forest Service expenditures and the estimated outputs in three program areas of grassland management: recreation, range, and wildlife and fish. The output levels used for this analysis represent the projected 10-year average for the planning period. Resource specialists have provided estimates based on the best available information and professional judgment. Where pertinent to the discussion of effects, some of the assumptions made to conduct analysis are explained. More information about the assumptions and processes used to conduct the analysis is provided in Appendix B.

The IMPLANpro model was used to estimate complex economic relations in order to approximate the effects of each alternative on the economy as a whole. The employment and

income estimated should be viewed as resource opportunities, not as actual jobs the alternatives will provide. The impacts estimated are based on the assumption of full implementation of each alternative. The actual changes in the economy will depend on individuals taking advantage of resource-related opportunities supported by each Curlew alternative. If market conditions, or trends in the cattle or tourism industries are not conducive to developing some resource opportunities, the impact on the economy will be different than estimated here. The following analysis is one of the many tools decision makers will use to compare the relative difference between alternatives.

The IMPLAN model is an input-output model that estimates and uses multipliers as a means to estimate the change in direct, indirect, and induced effects as a result of an adjustment in the level of final demand for the goods or services provided by a given sector of the economy. These multipliers also take into account the effects of leakage and imports.

Leakage occurs when money must be spent outside the analysis area in order to fulfill production needs – if a local restaurant requires seafood for production of dinner, the money spent in Washington or Oregon for fresh salmon is considered a leakage. The money has left the area and is no longer available for circulation within the local economy. Imports to the local area are basically someone else's leakage – when non-residents enter the analysis area for a weekend of bird watching, all the money spent within the county is considered new money, or an import to the economy. Government salaries, retirement benefits, and other types of money entering from outside the county is new money available for circulation. Because the study area includes Oneida County only, the leakage is significant because the county offers locals and visitors little opportunity to purchase goods and services locally. Most people will drive to larger communities in surrounding counties with greater selection of goods and services.

The following tables estimate the potential impact of each alternative on the employment and labor income in the analysis area. The model estimates how many jobs and associated income would be necessary in each sector to fulfill the resource demand of each alternative within the analysis area. The jobs estimated are not necessarily new employment – the tables display the total employment needed to produce each alternative's resource output but also accounts for the lack of infrastructure through leakage. The information displayed below highlights potential changes within Oneida County only – there would be additional changes likely to occur outside the study area in those larger communities where much of the goods and services used in Oneida County are purchased. Because these areas are significantly larger and constitute a functional economy, the impacts of changes in Grassland management is not likely to be large enough to have much influence, positive or negative.

Grazing activity for each alternative is based on the mid-point of head-months associated with alternative estimated low and high outputs. The current situation highlights the level of employment and income that is currently associated with Grassland activities, so the difference between alternatives can be compared to current operations. The results displayed in the following tables highlight only a total figure, which includes the direct, indirect, and induced impact of activity within the county associated with grassland management. A single job supported through cattle ranching in Oneida County may in turn support a portion of a retail job, a portion of a service job, and a portion of a government job. It is also important to note that in

the IMPLAN model, jobs can be part-time, full-time or seasonal. In this analysis, jobs are not the same as a Full Time Equivalent.

Table 4.17 displays the estimate of potential employment impact by alternative for the analysis area. Grazing activity is estimated to have the largest impact on the analysis area as compared to the current situation, but in general the differences between alternatives is minimal. Because little change in other resource uses is estimated to occur in any alternative, there is no change in estimated impacts. A majority of the jobs associated with grazing outputs are highlighted in the agriculture sector.

All alternatives show similar results with a change of only thirty potential jobs between the highest and lowest alternative. Alternatives A, E, and H estimate a potential increase from the current situation of three or four potential jobs. Alternative D estimates the total job loss of eliminating grazing on the grassland at twenty-three total job opportunities as compared to the current situation. All alternatives show a similar trend of increases among the grazing program, as head-months decrease so do estimated job opportunities. Alternative D would produce the lowest level of resource outputs under full implementation, but continued need of limited monitoring and management would result in some potential employment associated with Forest Service expenditures. While the alternatives would all continue to contribute to Oneida County's budget through the 25 percent payments, the impact of this funding is not significant enough to be displayed as a single job in this analysis.

Table 4.17 Average Annual Employment by Program by Alternative (Decade 1)

	Alternatives								
Resource	**Current**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Average Annual Jobs								
Recreation	2	2	2	2	2	2	2	2	2
Wildlife and Fish	1	1	1	1	1	1	1	1	1
Grazing [1]	22	26	22	15	0	21	19	19	22
Forest Service Expenditures	5	7	6	6	3	8	7	7	7
Total Forest Management [2]	30	36	31	23	6	32	30	28	32
Percent Change from Current	-	19	5	-22	-81	-6	-2	-6	5

Source: MIG 2001.

[1] The annual average output of head-months by alternative is based on a average between a low and high estimate. The change in jobs between the low and high output ranges between 3 and 7 additional job opportunities.

[2] Totals may not add due to rounding.

Table 4.18 highlights the same employment analysis, but by industry sector. This shows the distribution of potential employment impacts within the county. Because most of the impact is based on changes in grazing outputs, the largest number of jobs are seen in the agriculture sector as direct impacts of resource changes. The other sectors highlight the indirect impacts of changes in grazing outputs as well as some direct impacts associated with potential recreation and tourism opportunities within the trade, service, and other sectors. There were no employment changes within the mining, construction, or manufacturing sectors.

Table 4.18. Average Annual Employment by Sector By Alternative (Decade 1)

	Alternatives								
Resource	**Current**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Average Annual Jobs								
Agriculture	17	20	17	12	0	16	15	14	16
TPCU	0	1	0	0	0	1	0	0	1
Trade	6	7	6	4	2	6	6	6	6
FIRE	1	1	1	1	0	1	1	1	1
Services	3	4	3	3	1	4	4	3	4
Government	3	4	4	4	2	4	4	4	4

Source: MIG, 2001.

The model provides only an estimate of potential employment and income changes based on current infrastructure and current economic conditions. The impact of tourism on the current situation is limited due to the small number of business in Oneida County offering goods and services for tourist. In the future, if a local business opened or expanded to capture the spending of tourist, there would be less leakage out of the County and jobs and income may increase to a greater degree than estimated in this analysis. Similarly, if a rancher negatively impacted by the selected alternative was able to find a substitute for Grassland grazing opportunities, or if the ranching market changed significantly, the actual impacts would be different than those estimated in this analysis.

Table 4.19 displays the estimated annual average labor income within the analysis area. The labor income differences by alternative show similar trends as the employment figures with limited variability between alternatives and little change from the current situation. The largest increase is within the grazing program. Because the analysis of the federal payments to Oneida County includes only those 25 percents payments related to Grassland outputs, the impact is small with little difference between alternatives. The PILT and other Forest-related payments have a more significant impact to Oneida County, but are not related to these alternatives and so have not been included in the analysis. A specific analysis of federal payments is included in the following analysis.

Table 4.19. Average Annual Labor Income by Program by Alternative (Decade 1)

	Alternatives								
Resource	**Current**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
	Average Annual Income in Millions of Dollars								
Recreation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wildlife and Fish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grazing	0.9	1.0	0.9	0.6	0.0	0.8	0.8	0.7	0.8
Forest Service Expenditures	0.3	0.4	0.4	0.3	0.1	0.5	0.5	0.4	0.5
Total Forest Management[1]	1.2	1.5	1.3	0.9	0.2	1.4	1.3	1.2	1.4
Percent Change from Current	- -	23	6	-24	-86	15	6	-3	13

Source: MIG 2001.

[1] Totals may not add due to rounding.

Similar to the employment estimated, Alternatives A, E, and H estimate the largest increase in income related to grassland outputs compared to the current situation. Alternatives E, F and H

have the largest increase in Forest Service Expenditures associated with an increase in stewardship type work while maintaining an active level of grazing. The grazing output is lower than the current situation, but with an increase in habitat restoration and other management activities, these alternatives will increase other types of outputs and benefits.

Payments to the County

As explained earlier in this section, counties receive two types of payments as a result of the federal lands located within their boundaries. The first of these is Payment in Lieu of Taxes (PILT). These payments are not affected by changes in the Forest Plan as a result of the revision process. The second payment received by the counties is the 25 Percent Fund, which results from commercial use of the National Forest. Under the "Secure Rural Schools and Community Self-Determination Act of 2000," counties may choose to continue to receive payments under the 25 Percent Fund or to receive the county's proportionate share of the state's full payment amount from National Forest system lands, the legislation specifically excludes National Grasslands. Oneida County is one of the few counties with both National Forest and Grassland system lands within county boundaries. Oneida selected to be have stabilized payments from the National Forest system lands, in 2001 that payment will be $23,000.

The payments from the Grassland to Oneida County continue to be based on 25 percent of total revenues collected, with grazing being the only resource program that contributes significantly to overall revenues. The estimated payment amounts by alternative are displayed in Table 4.20 below. Table 4.20 shows that those alternatives that allow more head months, alternatives A, B, E and H, have higher Bankhead-Jones revenues than those that decrease head months, alternatives C, D, F and G. Alternative D has the highest PILT payment due to the formulas that allow payments to be increased if activity on the grassland declines. These PILT payments are only estimates; federal appropriations made by Congress can change PILT payments annually.

Table 4.20. Estimated Federal Payments to Oneida County Based on Estimated 10-year Annual Average Outputs by Alternative

Alternative	PILT [1]	National Forest 25 % Fund [2]	Grassland Bankhead-Jones	Total Payments
	Dollars			
5-year average	177,373	17,510	3,072	197,955
A	176,501	23,000	5,417	204,918
B	177,024	23,000	4,013	204,037
C	177,475	23,000	2,799	203,274
D	178,134	23,000	1,026	202,160
E	176,705	23,000	4,869	204,574
F	176,984	23,000	4,118	204,102
G	177,240	23,000	3,430	203,670
H	178,955	23,000	4,921	206,876

[1] Includes all federal land payments to the County

[2] Payments from Caribou and Sawtooth National Forests according to legislation, using the 2001 payment of $23,000 for each alternative.

Environmental Justice

Within a social and economic context, ecosystems are viewed as providing a wide variety of goods and services that enhance well-being and benefit a range of human wants and needs. Federal natural resource policy is expected to not only provide economic opportunities, but also to maintain our natural and cultural heritage. Some of these expectations have been expanded in the last five years by the growing interest in environmental justice. These concerns have resulted in Executive Order 12898, which requires federal agencies to analyze the environmental effects, including human health, economic and social effects of their actions on minority and low-income communities, addressing instances where the effects on these communities may be disproportionately high and adverse.

To evaluate the alternatives in terms of environmental justice, the following factors were used to identify Forest communities of concern: percentage of households below poverty level, the percentage of minority population. Using these criteria within Oneida County, none of the communities met either criterion. With this information, the Forest Service continued to hold community meetings and public meetings as scheduled without specific considerations to any individual communities.

Social Impact Analysis

Oneida County is rural in nature and it is unlikely that any of the action alternatives will change the character of the County. Alternative D would have the largest impact on the grazing community with all permittees losing their opportunity to graze cattle within the Curlew Grassland. To individuals directly impacted by such an action, Alternative D's total social and economic impact would be difficult to measure. As a whole, the county's economy may not see a long term significant impact, but socially the reduction in grazing may cause ripples throughout the county. If those permittees who are currently grazing within the Grassland are also leaders of their community, involved in family and school activities, or a strong supporter of community actions, their local community would lose a valuable resource if the permittee moved out of the area in search of either a substitute grazing opportunity, or a job opportunity outside of the ranching sector. The other action alternatives that reduce head months would decrease grazing activity, but it would not be as significant a loss as would be associated with Alternative D.

Any declines in ranching may be replaced in numbers by tourism, or more likely the continued trend of people commuting from rural areas to the surrounding urban areas. Those alternatives that offer a broader management of the grassland would likely offer the county the most diversity of opportunities and resource outputs. While these opportunities may replace the economic activity associated with grazing– or even increase the economic activity, many local people may feel that a change in their local economy would maintain their rural lifestyle.

Issue Statement: Changes in Grassland management may have social and economic effects such as impacts on jobs, income, and county revenues.

Each action alternative will change management of the Grassland. Alternative D is the alternative with the largest change in local jobs related to grazing opportunities. The other

alternatives change management and treatments and require some adjustment of head months, grazing dates, and required activities by permittees, but the differences between these other alternatives are small in summary. Of course, any on individual that may be impacted by these alternatives will feel significant changes from their current way of doing business. Similarly, the changes in county revenues from grazing on the Grassland will be limited, with Alternative D having the largest change with no grassland-related payments.

Similar to potential economic changes in head months, potential social changes related to different alternatives will be minor on the whole – with the exception of Alternative D which could have significant social impact throughout communities dependent on leadership and support of permittees and their families. Other actions occurring outside management of the grassland will likely have the most significant impact on communities. The trend of people moving into the area for retirement or to commute to urban areas for employment will likely change the social structure of local communities to a greater degree than the Grassland changes in head months.

Outside the local area, there are people who value wildlife and habitat improvements who would gain the most benefit from those alternatives that aggressively restore native vegetation and wildlife habitat. Often these groups are not as concerned about local economies or local issues concerning local resource uses, but are interested in maintaining their national forest and grasslands for habitat. It should be recognized that in selecting a final alternative, no alternative will be able to answer all the needs of all communities or interests since alternatives are compromises between competing uses and values. The Forest Service decision maker will consider all uses and values and will select the alternative that will balance national and local interests.

Cumulative Effects:

See page 4-207.

Irretrievable/Irreversible Effects:

Under Alternatives C, D, F, and G, potential reductions in grazing opportunities could be an irretrievable loss of grazing opportunity for Grassland permittees compared to Alternative A (No Action) and Alternative E. These are potential effects and specific changes in livestock use would be determined through a separate NEPA analysis and decision process during allotment management planning.

Differences in returns to the Treasury from changes in grazing opportunity and subsequent receipts from grazing fees would be an irretrievable loss. Reductions could also affect the availability of CP funds to implement rangeland improvements and conservation practices on the Grassland.

Livestock Grazing

Scale of the Analysis:

The geographic scope of the livestock analysis of management alternatives was conducted at the 47,600-acre Grassland scale. This geographic area was chosen because the Forest Service only has jurisdiction for livestock grazing on the Grassland.

The temporal scale selected for the analysis was existing condition on the Grassland today and at the end of the ten-year plan period. General long-term projections were made based on the treatments in each alternative if proposed treatments were to continue into future decades.

Scope of the Analysis:

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Livestock grazing effects in this section were analyzed based on estimated forage production, proposed livestock utilization levels and proposed treatments in each alternative for the existing situation, the ten-year plan period and the long-term planning horizon of 50-100 years.

***Decisions made in the revised Grassland management plan will not determine the number of livestock allowed to graze on the Grassland, nor the preferred grazing system or length of grazing season*.**

Standards and guidelines in the revised plan are designed to maintain and improve conditions on rangelands, taking into consideration vegetation structure requirements for wildlife species, riparian condition and stream bank stability, and the intensity of livestock grazing. During site-specific analysis for livestock grazing, the goals, objectives, standards and guidelines found in the revised grassland management plan are used to develop an allotment management plan. At this site-specific level, more specific grazing prescriptions can be developed to address site-specific resource issues. It is through this site-specific analysis decisions are made for stocking levels, grazing systems, and length of grazing season. The Forest Service retains authority to allocate any increase in forage production as a result of treatments described in each alternative to meet resource management objectives.

Desired vegetation conditions are described for each alternative in terms of sagebrush canopy cover. Utilization levels are estimated to achieve the desired condition in each alternative along with a variety of vegetation management treatments.

Rangeland Capability and Suitability on the Grassland

The first step in determining effects of the various management options described in the alternatives is the completion of a rangeland capability and suitability analysis. The criteria and process used to determine rangeland capability and suitability are described in the Livestock

Grazing section in Chapter 3. Table 4.21 displays the summary results of this process by alternative.

Table 4.21. Summary Results of Rangeland Capability and Suitability by Alternative

Alternative	Capable Acres	Suitable Acres
Alternative A (No action)	47,600	46,594
Alternative B (Proposed)	47,600	46,475
Alternative C	47,600	46,475
Alternative D	47,600	0
Alternative E	47,600	46,594
Alternative F	47,600	46,594
Alternative G	47,600	46,594
Alternative H (Selected)	47,600	46,594

Forage Production

Vegetation production on the Grassland is highly variable due to annual and seasonal fluctuations in precipitation, affecting available moisture for vegetation growth. Production figures shown for each alternative do not represent absolute peak biomass production, nor do they account for additional fall growth. They do not represent absolute production values or the range in productivity for a given site due to climatic variability or site-specific conditions. Data displayed in tables in this section are not used for stocking rate determinations.

Approximately 95 percent of the Grassland contains sagebrush in various canopy covers. Forage production decreases as sagebrush canopy cover increases. In order to compare the effects of the alternatives, estimated forage production in three sagebrush canopy cover classes was necessary. Calculations were made using three data sources (See Appendix G.) The result was a range of estimated forage production under sagebrush canopy cover classes. For purposes of displaying the effects of each alternative on livestock grazing, the mid range production estimations are used in this document.

General averages suggest production in the 0-5 percent canopy cover class ranges from 1,400 to 1,600 pounds per acre, with best sites at about 1,800 pounds per acre per year. In the 6-15 percent canopy cover class, production estimates range from 1,150 to 1,400 pounds per acre per year. In the greater than 15 percent canopy cover class, production estimates range from 500 to 1,200 pounds per acre per year, with some areas as low as fifty pounds per acres where sagebrush canopy cover is extremely dense and annuals and bulbous bluegrass are present in the understory (A. Winward, pers. comm., 2000)

Table 4.22 displays estimated total forage production on the Grassland by sagebrush canopy cover class.

Table 4.22. Total Estimated Forage Production By Sagebrush Canopy Cover Class

Capable Acres[1]	Sagebrush Canopy Cover	Pounds per acre	Total Pounds Forage Production
17% (8,092 acres)	0-5% cc	1,500 lbs/per acre/yr	12.1 million lbs/per yr
24% (11,424 acres)	6-15% cc	1,150 lbs/ per acre/yr	13.1 million lbs/per yr
59% (28,084 acres)	Greater than 15% cc	500 lbs/per acre/yr	14.0 million lbs/per yr
100% (47,600 acres)			**39.2 million lbs/per yr**

1 Acres include mountain brush and riparian areas

Complete calculations and assumptions for these and other forage production projections are found in Appendix G.

Calculation of Use

Each alternative proposes livestock utilization levels. Some alternatives provide utilization levels for all vegetation types while other alternatives propose utilization levels for native, non-native, and riparian areas. In addition, some alternatives propose vegetation treatments that could change forage production during the 10-year plan period and over the long term.

In order to show the differences in the alternatives, based on permitted head months, the estimated forage production was used to determine an **estimated or potential** range of head months by alternative. The two charts below show the potential range in head months by alternative based on the three data sources used in the computations.

Head Month information is used to compare the effects between alternatives and will not be used to set specific stocking levels. Any increase in forage as a result of treatments in any alternative would be allocated based on management resource objectives.

Direct and Indirect Effects:

Alternative A proposes 46,594 acres as suitable for livestock grazing. Based on these acres and the 60 percent utilization level proposed in this alternative, calculations for estimated forage production and potential head months were made for the existing situation (Year 0) and Year 10.

Treatments in this alternative focus on increasing forage production, particularly on low production sites, to reduce livestock grazing impacts on other areas of the Grassland. Approximately 21,480 head months are permitted on the Grassland today. Based on forage calculations, the range of potential head months could be higher or lower than currently permitted numbers based on site-specific conditions. Estimated capacity at 60 percent utilization in this alternative could possibly increase if other resource management objectives are met.

Table 4. 23. Alternative A
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Range of Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	**38.4 M**	**19,600-27,900**	**(+) or (-)**
Year 10	**44.3 M**	**21,700-31,500**	**(+)**

[1] Shown in millions of pounds and includes all vegetation types, sagebrush, mountain brush and riparian.

Over the decade, estimated forage production would increase from 38.4 million pounds to 44.3 million pounds. More sagebrush acres would be maintained in the higher production 0-5 percent and 6-15 percent canopy cover classes. As forage production increases, an increase in head months could be supported on a sustainable level, if livestock grazing is compatible with other resource management objectives.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term as sagebrush canopy cover is achieved, forage production could increase as more acres are maintained in the higher production canopy cover classes of 0-5 percent and 6-15 percent. Any additional forage could be available to meet resource objectives at that time.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

An average of 7,500 acres would be unavailable for livestock grazing beginning in the fourth year of the ten-year plan period. The loss of head months on these acres for the duration of the treatments or until grazing resumes would be an irretrievable loss.

No irreversible effects have been identified for this alternative.

Alternative B – Proposed Action

Summary Description of Treatments

In Alternative B, grazing would be allowed on 46,475 suitable acres. The remaining 1,125 acres would not be suitable for grazing.

Alternative B would treat 2,000 acres of sagebrush in greater than 15 percent canopy cover over the next ten years. Sagebrush would be managed for the majority of acres in the 6-15 percent and greater than 15 percent canopy cover classes.

Table 4.24 below displays the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.24. Alternative B
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition on Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome Percent of Sagebrush Acres	Desired Future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	15% of acres	10%-30% of acres
6%-15% canopy cover	24% of acres	17% of acres	40%-60% of acres
Greater than 15% canopy cover	59% of acres	68% of acres	30%-50% of acres

Approximately 150 acres of mountain brush vegetation types would be treated using prescribed fire in this alternative.

Approximately 3,700 acres of bulbous bluegrass sites would be prioritized for treatment (1,200 acres in 6-15 percent canopy cover class, and 2,500 acres in the greater than15 percent canopy cover class) using prescribed fire, plowing and reseeding with a mix of non-native and native grasses, forbs and shrub seed. **Note: The total acres of bulbous bluegrass treatment have been reduced by approximately 800 acres to reflect treatment of the North Carter field that was underway at the time this alternative was developed and proposed in the Notice of Intent.** Treated sites would generally tend to be at least 500 acres or larger.

To achieve the long-term goals proposed in Alternative B, three different livestock utilization levels are proposed: 45 percent for native vegetation, 50 percent for non-native vegetation, and 30 percent in riparian areas.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

● Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative B treats about 5,800 acres of upland vegetation over the ten-year plan period. Prescribed fire treatment requires two to four years to recover vegetation ground cover to a minimum of 60 percent generally needed for soil protection. Where bulbous bluegrass dominates the understory, treatments would include using a combination of prescribed fire, plowing, and re-seeding with a mix of native and non-native species. Existing bulbous bluegrass treatment protocols require no less than five years to recover ground cover to a minimum of 60 percent for soil protection. Over the ten-year plan period, up to 2,500 acres (6 percent of Grassland watersheds) could be in a disturbed condition each year, once the treatment program reaches the fourth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability would be less than if impacts were concentrated in a single watershed.

Proposed treatments specifically identify 3,700 acres of bulbous bluegrass dominated sites. After treatment and reseeding with a blend of native and non-native seeds, ground cover on these sites would be maintained near 60 percent or better.

Prescribed fire treatments on 2,150 acres outside of bulbous bluegrass areas would rely on natural regeneration. Vegetation that exists prior to treatment would be expected to regenerate after treatment. Ground cover potential on these sites would remain at 60-80 percent on native sites and 50-60 percent on non-native sites.

Surface runoff would increase in the short-term on the treated areas, which has a direct effect on erosion and sediment. The lack of protective cover during treatment would increase the potential for soil displacement and transport.

Prescribed fire treatments would not substantially alter the profile of the soil; however most, if not all, vegetative ground cover would be initially lost. Until vegetation is reestablished, surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement. If the treatment area is plowed, similar conditions to fire would occur; but plowing would alter the soil profile by mixing soil layers. Soil infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff and erosion could actually increase over natural rates on these sites.

Using the Forest Service WEPP (Water Erosion Prediction Project) computer model, predicted erosion rates at the site-specific level can range from near 0 tons per acre to nearly 10 tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have erosion rates ranging from near 0 tons to about 1.4 tons per acre, depending on residual ground cover and the intensity of precipitation following the treatment. Using this field

scenario and assuming up to 2,500 acres would be in a disturbed condition beginning in year 4 of the treatment program, an increase in erosion rates could range from near 0 tons to as much as 3,500 tons per year. If increased runoff and erosion from treated sites caused primary channels to adjust, overall watershed stability could be affected.

Livestock grazing would occur at slightly lower utilization rates than Alternative A. In this alternative, utilization would be reduced about 10-15 percent from current utilization levels. This use level would tend to improve overall ground cover potential. Microbiotic crusts would continue to be impacted by hoof action, which would tend to degrade this form of soil protection.

Existing road densities are relatively low. Localized unimproved roads and Off Highway Vehicle (OHV) trails compact soils and can increase localized runoff and erosion. Overall, the impact of these activities on a watershed scale is minor. In this alternative, travel management would not change from existing situation. Long-term effects from recreation uses on watershed condition would remain about the same as the current situation.

Overall watershed condition, particularly where treatments are occurring, would be expected to decline initially, but as ground cover is reestablished, conditions would improve to the existing condition or be slightly better than existing conditions. Overall ground cover would be expected to improve in bulbous bluegrass treatment areas by reseeding with a seed mix that provides a greater ground cover potential.

Watershed condition within the Grassland would be expected to improve slightly overall. Total watershed ratings for both public and private lands would not be expected to substantially change without soil conservation, runoff and erosion controls watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site would be degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer provide a viable ground cover source. As long as these conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass, potential ground cover would remain less than sites that support other, more desirable plant species. Watershed condition would be maintained at less than potential in these areas. As long as non-native species, such as bulbous bluegrass, dominate a site, ground cover potential of these sites would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which could result in increased runoff and erosion potential.

There are no proposed management actions within this alternative that would result in irreversible effects on watersheds.

Riparian Condition

Alternative B proposes a 50 percent vegetation utilization rate by livestock for non-native vegetation, a 45 percent utilization level for native vegetation and a 30 percent utilization level or a 6 inch stubble height, whichever is reached first, on riparian vegetation. This alternative also proposes a Riparian Wetland Area (RWA) of special emphasis. Zone widths would be 75 feet for non-fish bearing reaches and 150 feet for fish bearing reaches. Range structural developments would be allowed provided they do not inhibit attainment of RWA goals. Treatments in this alternative include prescribed burning and plowing on the uplands. Approximately 5,850 upland acres would be treated. No riparian areas would be treated in this alternative.

Direct and Indirect Effects:

Livestock grazing impacts to stream channels, riparian areas and wetlands would be reduced in this alternative. Approximately twenty-four miles of streams and riparian/wetland areas would be accessible to livestock, the same as Alternative A. A lower vegetation utilization rate by livestock and residual stubble height for riparian vegetation and bank damage standards are proposed in this alternative. As a result, the overall density and vigor of streamside vegetation would be expected to improve along with a reduction in the release of livestock-generated bacteria and nutrients. Additionally, new stream bank disturbance parameters would be expected to reduce bank damage, which would contribute to an improvement in water quality. Woody (willow) vegetation density and vigor should begin to improve within several years, particularly where these vegetation types currently exist but are suppressed. RWA standards would be applied consistently to every Riparian Wetland Area (RWA), regardless of condition.

The riparian pasture along South Fork Rock Creek should contribute to a reduction in the overall sediment loading of this 303(d) water quality limited stream. Specific guidelines for allowable streambank disturbance and lower livestock utilization rates would serve to reduce sediment loading but may not be to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams throughout the Grassland would improve slightly as specific grazing standards and guidelines are established that reduce impacts to riparian areas and stream channels. However, even though some improvement in water quality may occur, this alternative does not fully meet the intent of the Clean Water Act and Idaho's antidegradation policy of fully supporting designated beneficial uses.

Following the improvement of streamside vegetation, stream channel condition and function also would be expected to begin to improve. Stream channels that are currently assessed as functioning or functional-at-risk would see an improvement within a few years following vegetation improvement. More degraded channels, assessed as functioning-at-risk or nonfunctioning, would require more time to heal. Upstream influences, particularly from farming, would continue to influence channel stability and riparian vegetation growth. Channels that have been deeply downcut may take decades to recover as evolutionary processes stabilize the channel.

Upland effects on water quality and channel stability can range from non-measurable to considerable (See Watershed Section under Alternative B for more discussion), depending on vegetation treatment locations and the stream condition and channel type. In most cases, slopes within the Grassland are generally less than 20 percent, with many less than 4 percent. Runoff increases on these more gentle slopes would be less than the amount potentially produced from steeper slopes. A decrease in potential runoff would result in a corresponding decrease in potential sediment. Expected increases in erosion rates can range from near 0 on flat slopes with ground cover greater than 60 percent, to as much as seven tons per acre on 20 percent slopes with no ground cover following a heavy precipitation event.

Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases would be relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions.

Long-term improvements in overall water quality would be expected over current conditions in this alternative. Lower grazing utilization levels would generally be sufficient to improve water quality. If streams within or directly adjacent to the Grassland are determined by the State as not meeting beneficial use standards and listed as a 303(d) stream sometime in the future, standards would be generally sufficient to improve degraded water quality conditions. However, the "one-size-fits-all" criteria may not be adequate to fully meet the State's established TMDL standards. Potential impacts to water quality from proposed vegetation treatments would have to be evaluated at the site-specific level on a project-by-project basis.

Impacts from adjacent lands in other ownerships would be expected to continue at present rates. The Grassland contains only a small portion of the entire Rock Creek and Deep Creek watersheds. Impacts from other land ownerships would play an important role in the success of any improvements made within the Grassland.

A total of fourteen miles of stream would move toward Properly Functioning Condition at a moderate rate. The rate of improvement would be faster than Alternative A.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality would be irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area is dependent on the extent of the degradation and the corrective actions taken. Riparian areas within fenced pastures should recover slowly over one or more decades. Riparian areas outside of riparian pastures would generally require a longer period of time to recover.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to a previous condition. Through prudent management practices, some of these channels could be stabilized in the existing state and overall stability improved; however, to be fully functional, these channels would have to undergo an evolutionary process that could take decades. In these cases, historical channel conditions are no longer achievable which would be an irreversible commitment of this resource.

· Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

The effects the proposed treatments in this alternative would have on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

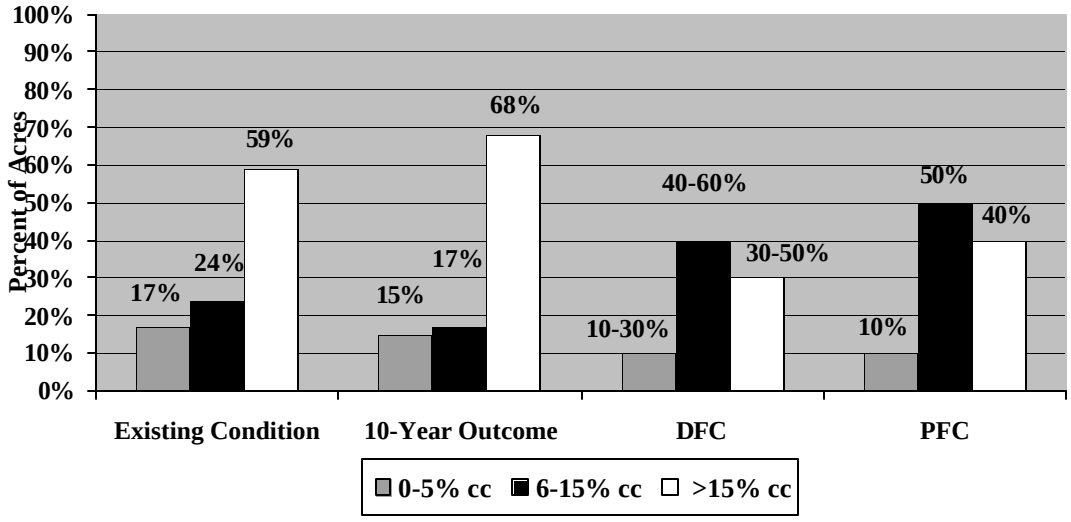
Direct and Indirect Effects:

Curlew National Grassland

Treatments and natural succession in this alternative would decrease the number of sagebrush acres in the 0-5 percent canopy cover class by about 2 percent during the 10-year plan period. A decrease of about 7 percent would occur in the number of sagebrush acres in the 6-15 percent canopy cover class. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by about 9 percent.

Figure 4.5 displays the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.5. Alternative B
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and VDDT Model.

The ten-year outcome results from the VDDT Model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.25.

Table 4.25. Alternative B. Ten-Year VDDT Model Outcomes on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	15%
6-15% canopy cover	17%
16-25% canopy cover	24%
>25% canopy cover	44%

The ten-year projected outcome of treatments proposed in this alternative would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require additional treatments on sagebrush acres in the greater than 15 percent canopy cover to increase the number of sagebrush acres in the 6-15 percent canopy cover. Over the long term (50 to 100 years), succession and treatments in following decades would trend the sagebrush cover type on the Grassland toward the desired long-term goal.

The sagebrush cover type on the Grassland would not meet sagebrush PFC criteria during the 10-year plan period. Over the long term, with additional treatments in subsequent decades, sagebrush acres would trend toward the range for PFC structure, composition, and patterns. Patterns would continue to be influenced by land practices private lands adjacent and within the Grassland boundary. Although the PFC criteria for composition would be met on the Grassland, surrounding intermingled lands would remain outside PFC criteria.

When disturbances occur, such as lethal fire, an increased risk of undesirable and non-native plant invasion may also occur. Shrubs that sprout after fire, such as threetip sagebrush and rabbitbrush, may increase and even become dominant. Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

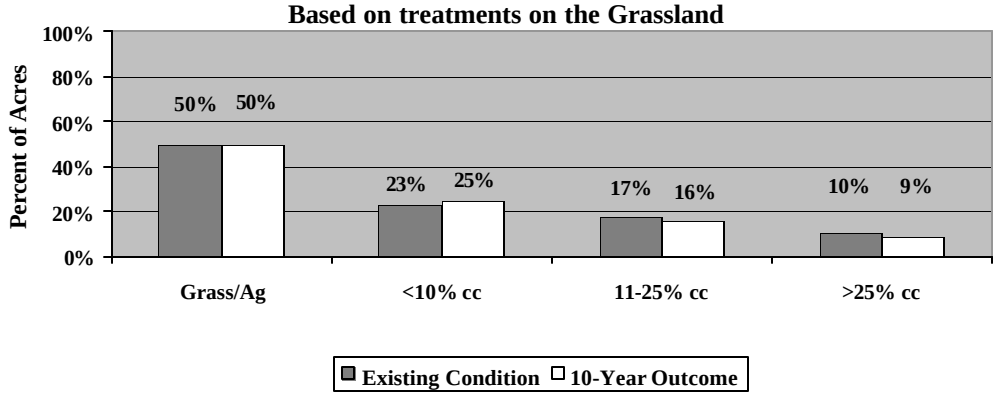
Managing Grassland resources under Alternative B would maintain the sagebrush system at a **low** to **moderate** magnitude of departure from the historic range of variation. This degree of departure would be an improvement over Alternative A. This degree of departure could reduce the sagebrush system's resiliency and ability to recover after disturbance over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 83,300 acres, a reduction of about 5 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural crop practices prevent sagebrush from reestablishing. Fire suppression causes the sagebrush ecological type to remain outside PFC criteria.

Figure 4.6 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.6. Alternative B
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection on sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irreversible or irretrievable effects were identified in this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative would treat approximately 150 acres of mountain brush using prescribed fire and natural regeneration to move these acres into early age structure and composition. At the end of the 10-year plan period, approximately 11 percent of the mountain brush acres on the Grassland would be in early age structure and composition. Approximately 89 percent would be in late age structure and composition. Treatment size ranges from small patches of less than 50 acres up to150 acres.

Vegetation treatments that use prescribed fire would cause sprouting of many mountain brush species (Bradley, *et al*, 1992). Treatments proposed in this alternative would trend mountain brush acres toward a more natural 20-40 year fire return cycle. As a result, the risk of larger more intense fires would be reduced.

Limited treatments proposed in this alternative would create some diversity in age classes. This alternative has a **moderate** degree of departure from the historic disturbance regime and a **low** to **moderate** department from succession and structure. Long-term maintenance and sustainability of mountain brush would increase resiliency to disturbances such as fire. PFC criteria for the mountain brush would be met on the Grassland.

Greater Curlew Valley Area

Mountain brush, approximately 35,660 acres, in the Greater Curlew Valley Area would continue to mature similarly to Alternative A. This alternative would have little effect on the mountain brush condition in the GCVA. A small positive effect could occur as mountain brush acres on the Grassland trend toward a more natural fire regime, reducing the risk of large, intensive fires that may be outside the natural range of variation for this cover type.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

No irretrievable or irreversible effects have been identified.

Vegetation Understory Composition

Direct and Indirect Effects:

Prescribed fire treatments using natural regeneration on sagebrush acres in the greater than 15 percent canopy cover class would not change understory composition on non-native sites. If treatments occur on crested wheatgrass sites, crested wheatgrass would naturally regenerate along with other highly competitive non-native species, such as alfalfa, that may still remain on the site. Native grasses and forbs would not be expected to re-establish in the community to any great extent due to the competitive nature of crested wheatgrass which is capable of surviving fire.

Removing dense sagebrush canopy cover would stimulate understory production as additional moisture and nutrients become available. Any existing forbs in the understory could be lost as a result of prescribed fire treatments, because of the highly competitive nature of crested wheatgrass. Without treatment, the sagebrush overstory would become denser on crested wheatgrass sites, up to 30-40 percent (Bunting). Moisture and other nutrients would not be available for understory vegetation. As a result, understory vegetation would become sparser and less vigorous and less productive.

Prescribed fire treatments on native plant communities would move them into an early seral stage. More annuals could be expected in the understory immediately after treatment. Individual plants of cheatgrass can be found scattered along disturbed sites on the Grassland. If cheat grass is present in the existing vegetation prior to treatment, prescribed fire treatments could actually hasten its invasion into treated areas by removing herbaceous competition. By opening up the overstory, perennial would appear within a year, depending on growing conditions, followed by forbs and then grasses. Forb species existing on-site at the time of treatment would reappear after treatment in greater densities and vigor with grasses germinating soon after. Over time, early seral species would gradually become sparser as the canopy cover increases over a 20 to 40 year cycle. Production capacity would be weighted more heavily to the herbaceous layer until shrubs reestablished.

Mountain brush treatments in this alternative would reduce about 11 percent of the acres to an early seral stage, leaving the remaining acres in the older seral stage. No mid-seral stage would be present. Because most of these acres occur on native range, the diversity of the shrub and herbaceous layer offers a variety of habitats for wildlife. It is expected that treated mountain brush acres would respond similarly to sagebrush in native plant communities after treatment. By opening up the overstory, more annuals could be expected in the understory immediately after treatment. If cheatgrass is present in the existing vegetation prior to treatment, prescribed fire treatments could actually hasten its invasion into treated areas due to lack of herbaceous competition. Perennial species would appear within a year, depending on germination and growing conditions, followed by forbs and then grasses. Forbs species existing on-site at the time of treatment would reappear after treatment in greater densities and vigor with grasses germinating soon after. Over time, early seral species would gradually become sparser as the canopy cover increases over a twenty- to forty-year cycle. Production capacity would be weighted more heavily to the herbaceous layer until shrubs reestablished.

Bulbous bluegrass treatments would enhance the production and diversity of approximately 3,700 acres currently dominated by this species. In this alternative a seed mix of native and non-native grass, forbs and shrubs would be used for restoration on these sites. Production would increase over current levels once bulbous bluegrass is eliminated on these sites. Native grasses, forbs and shrubs would produce more vegetation per acre than bulbous bluegrass, but less than sites dominated by crested wheatgrass or other higher producing non-native species. Understory diversity would also be enhanced with the introduction of native forbs into the seed mix. Including native sagebrush or other native shrub seeds in the seed mix would stimulate shrub re-establishment on these sites more rapidly than if brush re-establishment occurred naturally over time. As shrub types become established over time, production would be reduced.

This alternative proposes a 45 percent livestock use rate on natives, 50 percent livestock use on non-natives, and 30 percent (or a 6 inch stubble height) livestock use rate on riparian plants.

On sites with introduced crested wheatgrass species, a 50 percent livestock use rate may actually be too low to sustain plants in a healthy, desirable condition. Early season production and resiliency to utilization at that time of the year on crested wheatgrass has filled a niche that native grasses cannot fill. Plants that are grazed in one year are the same plants that are grazed in following years. Wolf plants, plants that become unpalatable and rank due to heavy foliage growth, are avoided by heavy grazing to take off the current growth so it does not build up over time. Any loss of forage production on non-natives will be transferred to natives with a subsequent loss in grazing flexibility and possible deterioration of that resource (Kindschy). Studies indicate that 60-70 percent is considered a moderate level of livestock use on crested wheatgrass stands (Horton and Weissert, Technical Bulletin #1388). Torell and Godfrey suggest that slightly over 70 percent is optimum. Grazing at a 50 percent use level would be expected to decrease the vigor of plants over time and create increasing numbers of wolf plants thereby decreasing capacity for livestock grazing.

On sites of bulbous bluegrass, a 50 percent livestock use level of could also allow plants to retain strong vigor and reproductive capacities. It would not be expected to be detrimental to the plant.

On native sites, a 45 percent use rate is considered to be moderate on most palatable species of cattle forage. This use level would be expected to occur mostly on grasses rather than forbs. Holechek, *et al*, state that research shows that 40-45 percent is considered moderate use on most rangelands and 30-35 percent would provide for improvement in rangeland vegetation. Rasmussen suggests that the "take half, leave half" rule is still sound as long as the plant has meristematic tissue available for regrowth. This is generally considered to be an ecological sustainable level of use.

On riparian areas, a 30 percent livestock use level or 6-inch stubble height would be expected to maintain riparian plants in a high state of vigor and allow them to spread and develop a deeper root system. For species that were not the most desirable, this level of grazing would be expected to create conditions that would allow for more desirable species to reestablish. Improvement in aquatic habitat processes would be expected over time.

This alternative provides the best opportunity to improve understory diversity on 3,700 acres of bulbous bluegrass. All 3,700 acres would be reseeded with a mix of native and desired non-native seeds. Only 1,500 untreated acres would remain at the end of the ten-year plan period.

Cumulative Effects:

See page 4-197.

Irreversible/Irretrievable Effects:

The loss of forage on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with them could also be causing an irretrievable effect yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances to the point that pathways have been altered. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation re-establishes.

Wildlife Habitat Management

Direct and Indirect Effects:

Effects on Sagebrush Habitat

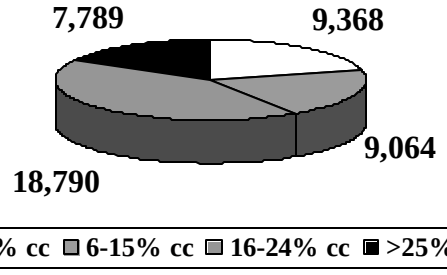
Alternative B proposes a .25-mile buffer around known lek locations for suitable for sage grouse nesting and brood-rearing habitat.. Although vegetation treatments could occur within the .25-mile buffer zone, it is assumed that treatments would be completed outside of buffer zones prior to treating inside the buffer zone. Vegetation treatments in relationship to lek locations would be analyzed at the site-specific level prior to treatment.

Table 4.26. Alternative B. Changes in Percentage of Sagebrush Canopy Cover over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	15%	50%	50%
6-15% cc	24%	17%	23%	25%
16-24% cc	42%	24%	17%	16%
>25%	17%	44%	10%	9%

Figure 4.7 displays the existing distribution of sagebrush canopy cover classes outside the .25-mile buffer of known lek locations.

Figure 4.7. Alternative B
Exsiting Acres in Sagebrush Canopy Cover Classes
Outside of .25-Mile Buffer
Year 0



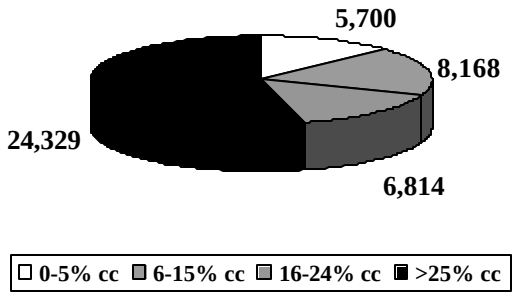
Buffer zones in this alternative encompass about 5 percent of the Grassland acres. No treatment would occur within these buffer zones.

About 95 percent of the Grassland would be available for treatment outside of the buffer zones. Treatments could be distributed across the landscape and would treat approximately 22 percent of the acres with canopy cover greater than 15 percent outside buffer zones. Assuming the average size of individual treatments would be ~750 acres, six treatments on acres in greater than 15 percent canopy cover would be needed. Effects on fragmentation and connectivity would be variable depending on the location of the treatments. Treatments proposed could reduce the number of existing habitat patches of sagebrush in canopy cover greater than 15 percent and in greater than 320 acres from nineteen to twelve.

Avian species-at-risk are able to cross unsuitable habitat, and treatments are not barriers to movement. Less-mobile species, like the pygmy rabbit, would see fragmentation of habitat in treated areas, but overall canopy cover will increase and habitat connectivity will increase.

Figure 4.8 displays an estimation of the results of treatments and succession on canopy cover classes in Year 10 on the acres outside of buffer zones. Figure 4.8 does not necessarily represent true on-the-ground conditions in Year 10. It is used as a tool to show differences between alternatives only.

Figure 4.8. Alternative B
Estimated Acres of Sagebrush Canopy Cover
Outside .25-Mile Buffer
Year 10



Effects on Riparian Species

This alternative proposes to manage riparian areas as special emphasis areas. On non-fish bearing streams, a special Riparian/Wetland Area (RWA) would be established 75 feet on either side of the stream. For fish bearing streams, a 150-foot RWA would be established. Livestock utilization would be set at 30 percent or a six-inch stubble height within the RWAs.

Special riparian areas should provide adequate late spring and early summer brooding habitat for sage and sharp-tail grouse, and year-round habitat for other riparian-related wildlife. Using a livestock utilization rate of 30 percent (dry weight) in the RWAs should provide a residual vegetation height of 6 inches (Kinney and Clary, 1994). Although no guideline has been set for the minimum residual vegetation height required by sage and sharp-tailed grouse in riparian zones, the six-inch stubble height proposed should provide security cover for broods in late summer (D. Meints, Wildlife Biologist, Idaho Department Fish and Game, pers. comm.). An increase in brood survival could be expected if utilization rates provide the quality and quantity of brooding habitat expected. It is likely other ground-nesting birds associated with riparian areas would also show increases in nest success.

Areas inside existing riparian pastures or exclosures would be expected to continue in an upward trend. As the functioning of the stream channel and streamside vegetation improves over the long-term, habitat for breeding birds should increase. Vegetation on the functioning reaches would continue to provide suitable habitat for nesting birds where it currently exists. Improvement in the quantity and quality of streamside vegetation on stream reaches that are functioning-at-risk or non-functioning would improve very slowly, but measurable changes would not be expected by the end of ten-year plan period. A number of the functioning-at-risk stretches with suppressed and browsed willows may see an increase in willow height within the decade, but not to the point that sufficient structure would be present for shrub nesters.

Table 4.27. Alternative B. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would increase slightly above currently low levels.
How well the alternative meets conservation measures	This alternative does not meet conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to remain at low levels and be poorly distributed across the Grasslands, due to the isolated areas of currently suitable habitat.

Effects on Sagebrush-associated species (except Sage grouse)

The distribution of sagebrush canopy cover classes at the end of the decade is expected to shift more acres into the greater than 15 percent canopy cover class with fewer acres in the 0-5 percent or 6-15 percent canopy cover classes. This shift would not meet PFC criteria for the sagebrush type. It would result in a decrease of available habitat for species associated with more open stands, such as short-eared owl and long-billed curlew.

Avian sagebrush-associated species nest on the ground under shrubs or in taller sagebrush plants. Selection of nesting habitat is more a function of sagebrush density, but feeding behavior is related to the availability of grass and forbs seeds or insects found in the understory that make up most of their diet. The increase in sagebrush canopy cover would benefit these species up to the point where understory diversity is lost. The pygmy rabbit, which uses dense stands of sagebrush, and feeds on sagebrush, would see an increase in habitat and decreased vulnerability to predation.

Upland livestock utilization levels would be established at 45 percent for native and 50 percent for non-native vegetation. An estimate of residual vegetation based on this utilization level is not exact, but information shows that at these utilization levels, approximately 2/3 of the plant height will be retained. This lower utilization would result in increased residual vegetation height after the end of the grazing season. This increase in residual vegetation height would improve nesting success and brood survival for species using the grassy understory for foraging or cover.

Table 4.28. Alternative B. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	A 2% decrease would be expected in suitable habitat over the Grassland, and a 2% increase over the GCVA, based on sagebrush overstory. Utilization levels of 45-50% are predicted to be adequate to increase cover for voles. Populations of short-eared owls would be expected to increase above current levels across both the Grassland and GCVA.
Long-billed curlew	A 2% decrease would be expected in suitable habitat over the Grassland, and a 2% increase over the GCVA, based on sagebrush overstory. Utilization levels of 45-50% may decrease areas of suitable habitat for nesting, but vegetation treatments would result in increased areas of suitable habitat for nesting on the Grassland. Populations of long-billed curlew would be expected to stay at current levels on the Grasslands and increase over the GCVA.
Columbian Sharp-tailed grouse	Approximately 85% of sagebrush acres would remain in greater than 5% canopy cover. Burn treatments would be revegetated through natural regeneration. Bulbous bluegrass treatments would be reseeded using either native or non-native species, which would result in an estimated increase in crested wheatgrass on 1,850 acres (6% increase). Utilization levels of 45-50% would increase nesting cover and would be expected to increase nesting success. Mountain brush treatments would reduce potential winter habitat by reducing abundance by 4 percent on the Grassland. Populations of sharp-tailed grouse would be expected to remain at current levels on the Grasslands and increase slightly over the GCVA.
Pygmy rabbit	A 9% increase would be expected in suitable habitat over the Grassland, and a 1% decrease over the GCVA, based on sagebrush overstory. Fragmentation would increase, with a drop from 19 to 12 in the number of sagebrush patches in greater than 320 acres in denser stands. There may be a 6% increase in crested wheatgrass sites. Populations and distribution would be expected to decrease from the current levels.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative avoid vegetation treatments with 0.25 miles of active sage grouse leks in habitats considered suitable for sage grouse nesting and brood rearing. It is assumed vegetation treatments would occur outside of buffer zones first.

Over the ten-year plan period, sagebrush would be managed to provide 68 percent of the acres in the greater than 15 percent canopy cover. Approximately 5,700 acres would be treated with prescribed fire. Of these, about 2,000 acres would be treated outside of bulbous bluegrass sites where sagebrush canopy cover is greater than 15 percent. Acres treated with prescribed fire would shift to the 0-5 percent canopy cover. Succession, over the ten-year period, would continue to shift existing younger stands into denser canopy classes. As a result, the quantity of sage grouse nesting habitat would be expected to increase within the decade. However, the quality of nesting habitat would decrease as understory diversity is lost as sagebrush canopy

cover increases. This trend is expected in the greater than 25 percent cover class, which increases from 7,789 acres to 24,329 acres.

The desired future condition would result in a mosaic of sagebrush acres where10-30 percent of the acres would be in 0-5 percent canopy cover; between 40 and 60 percent of the acres would be in 6-15 percent canopy cover and approximately 30 to 50 percent of the acres would be in greater than 15 percent canopy cover. This desired condition would not meet this guideline, but would improve understory components.

Alternative B proposes to treat 3,700 acres of sagebrush where bulbous bluegrass dominates the understory. Approximately 2,500 acres would be treated in the greater than 15 percent canopy cover class and 1,200 acres would be treated in the 6-15 percent canopy cover class. Treatments require burning, plowing and reseeding with a mix of native and non-native grass and forbs species. Prescribed burning is also proposed on 2,000 acres. (See the Vegetation Understory section under Alternative B for a discussion on changes in understory composition and structure in relationship to proposed treatments in this alternative.)

Understory diversity would be expected to improve on these acres if native species are reestablished. Following these treatments, the area would not meet the requirements of this guideline. It will likely take five to ten years to meet the understory requirements and twenty-five to thirty- years to meet the overstory density in the bulbous bluegrass treatments and twenty to twenty-five years in the prescribed burn treatments.

Upland utilization would be established at 45 percent for native and 50 percent for non-native vegetation. Information suggests this will result in the retention of about four-to six-inch residual vegetation height and should move towards meeting the intent of this guideline.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

The travel plan in this alternative is similar to Alternative A and does not reduce the potential for disturbance during the breeding season.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative B for a discussion on potential erosion rates based on treatments in each alternative. See the Vegetation Understory section under Alternative B for a discussion on changes in understory composition and structure in relationship to proposed treatments.)

Land use practices have the potential to increase erosion and exotic plants. Treatment of bulbous bluegrass and resultant improvements in understory should improve water infiltration (See the Watershed Section under Alternative B) and increase abundance and diversity of forbs (See Understory Vegetation Section under Alternative B). Prescribed burning will result in a short-term increase in bare ground, but vegetation is expected to reestablish in the year following treatment. Mitigation and design features to avoid areas of cheatgrass, rabbitbrush, or other areas will minimize exotic or undesired plant establishment. A reduction in grazing utilization would not increase erosion from present levels. This alternative would meet this guideline over the long term.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Sage grouse winter cover would be slightly reduced, when areas of sagebrush in canopy cover class greater than 15 percent are treated; however, the number of acres of sagebrush canopy cover classes in greater than 15 percent will increase over the existing condition and increase potential winter habitat.

Overall Findings on Compliance with Sage Grouse Guidelines

Alternative B partially meets the Sage Grouse Guidelines. An increase in the number of sagebrush acres in greater than 15 percent canopy cover would be expected over the plan period. Proposed utilization levels are expected to result in an increase in residual vegetation at the end of the grazing season. Understory diversity would improve slightly if native seeds reestablish on treated sites. Although disturbance is not as extensive in this alternative as in Alternative A, the amount and kind of disturbance would have the potential to increase disturbance to breeding or nesting birds.

Miles of Tree Rows at End of Decade

No data are available to determine if an increase of ten miles of tree rows proposed in this alternative, from twenty-one to thirty-one, would impact habitat for sage grouse or other sagebrush obligate species. Continued planting of non-native Russian olives on sites that are shrub sites could be detrimental to native bird species. Additional trees could provide more denning, roosting and nesting sites for predators that may adversely impact sage and sharp-tailed grouse and other breeding bird production.

No data is currently available to support this theory; however, since sage and sharp-tailed grouse did not evolve with large deciduous trees, it is possible that the influences of such plantings could impact populations. Planting of additional miles of tree rows could increase the potential for predator and cowbird problems with native species.

Cumulative Effects:

See page 4-197 and 4-201.

Irretrievable/Irreversible Effects:

A total loss of 4,500 acres of sagebrush in greater than15 percent canopy would result in an irretrievable loss of optimal cover for sage grouse nesting habitat until sagebrush reestablishes and reaches greater than 16 percent canopy cover.

Lack of understory diversity would result in an annual irretrievable loss of foraging and nesting opportunities for ground-nesting and ground-foraging birds until species in the understory reestablish or remain on site after the grazing season to provide necessary security cover and diet components for these birds. Loss of understory for sharp-tailed grouse nesting would be irretrievable for one year following prescribed fire treatments. In this alternative, approximately 2,000 acres would be lost over the ten-year plan period. An additional 3,700 acres would be lost for six years after treatment for bulbous bluegrass.

· Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Alternative B proposes 46,475 acres as suitable for livestock grazing. Based on these acres and the 45 percent utilization level for native vegetation, the 50 percent utilization for non-native vegetation, and the 30 percent utilization for riparian areas, calculations for estimated forage production and potential head months were made for the existing situation (Year 0) and Year 10.

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Direct and Indirect Effects:

Treatments in this alternative focus on bulbous bluegrass and crested wheatgrass sites with low forage production to improve understory diversity by increasing grasses and forbs.

Calculations for estimated forage production indicate head months at proposed utilization levels in this alternative would range from 15,800 to 22,500 compared to the 21,480 head months currently permitted.

Table 4.29. Alternative B
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	38.4 M	15,800 - 22,500	(+) or (-)
Year 10	35.3 M	15,000 - 25,400	(+) or (-)

[1] Shown in millions of pounds and includes all vegetation types – sagebrush, mountain brush, and riparian.

Over the ten-year plan period, forage production would decrease from about 38.4 million pounds to about 35.3 million pounds. More acres would be maintained in the greater than 15 percent canopy cover at the end of the 10-year plan period. As production declines, a decrease in head months from Year 0 may be necessary to maintain livestock grazing at sustainable levels.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if treatments continued, forage production would increase as desired sagebrush canopy covers were achieved. More acres would be in the higher productive canopy cover types, generally 0-5 percent and 6-15 percent canopy cover classes with fewer acres in the greater than 15 percent canopy cover class. Any increase in forage production would be available to meet resource management objectives at that time.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Utilization levels and treatments proposed in this alternative could result in a decrease in head months at the end of the ten-year plan period. Any decrease would be an irretrievable loss.

An average of 3,000 acres would be unavailable for livestock grazing beginning in year five of the ten-year plan period. The loss of head months as a result of treatments would be an irretrievable loss during treatment periods or until grazing resumes.

No irreversible effects have been identified for this alternative.

Alternative C

Summary Description of Treatments

Alternative C would allow grazing on 46,475 suitable acres. The remaining 1,125 acres would not be suitable for livestock grazing.

Alternative C proposes to treat approximately 4,000 acres of sage grouse habitat over the next ten years using a combination of brush beating, prescribed fire, and plowing on bulbous bluegrass sites, and herbicide treatments outside of bulbous bluegrass sites.

Under this alternative, vegetation treatments on the Grassland would take into account the vegetative condition of adjacent land ownerships and sage grouse needs. About 2,500 acres of sagebrush in greater than 25 percent canopy cover would be treated using herbicides to achieve 15-25 percent canopy cover on treated acres. The majority of sagebrush acres would be managed for sagebrush canopy cover in greater than 15 percent to enhance sage grouse nesting and brood-rearing habitat.

Table 4.30 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.30. Alternative C
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Class	Existing Condition Percent of Sagebrush Acres	First Decade Outcome Percent of Sagebrush Acres	Desired Future Condition Percent of Sagebrush Acres
0%-5% Canopy Cover	17% of acres	7% of acres	<25% of acres
6%-15% Canopy Cover	24% of acres	14% of acres	<25% of acres
Greater than 15% Canopy Cover	59% of acres	79% of acres	>50% of acres

No mountain brush treatment is proposed in this alternative.

Bulbous bluegrass in sagebrush understories would be treated and revegetated using a native only grass, forb, and shrub seed mix. This alternative proposes to treat 1500 sagebrush acres, where bulbous bluegrass dominates the understory, in the less than 15 percent canopy cover by brush beating/prescribed fire, plowing and reseeding. Vegetation treatments would be prioritized based on the biological needs of sage grouse, including pre-nesting, nesting and brood-rearing habitat. Treated sites would generally tend to be smaller in size, generally less than 500 acres.

In this alternative, a 30-40 percent livestock utilization level is proposed for both upland native and non-native vegetation. A 20-50 percent riparian livestock utilization level is proposed based on the properly functioning condition of the stream. It is assumed lower utilization levels would be used on streams that are not functioning or functioning-at-risk.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

• Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative C treats about 4,000 acres over the ten-year plan period with prescribed fire, plowing and herbicides. About 1,500 acres, where bulbous bluegrass dominates the understory, would be treated using prescribed fire, plowing, and re-seeding with a mix of native and non-native species. Current bulbous bluegrass treatment practices require no less than five years to recover ground cover to a minimum of 60 percent for soil protection. Over the ten-year plan period, up to 750 acres (about 1 percent of Grassland watersheds) could be in a disturbed condition, once the treatment program reaches the fifth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability could be less than if impacts were concentrated in a single watershed.

The 2,500 acres proposed for treatment using herbicides, would have negligible effects on watershed stability and condition. Even though overstory canopy cover would be reduced, the chemical does not affect the understory. The density of the understory component in these areas would remain about the same or increase somewhat as the sagebrush canopy is removed. Watershed hydrology is not substantially changed as a result of the treatment.

Although sagebrush plants use more water than herbaceous understory vegetation, removing the woody overstory using an herbicide should not affect total water yields on a watershed scale. Herbaceous understory vegetation would use any additional available water within their rooting zone. Changes in runoff would be negligible on these sites.

Proposed treatments in this alternative specifically identify 1,500 acres of bulbous bluegrass dominated sites. After treatment and reseeding with native species only, ground cover on these sites would be improved above.

On treated bulbous bluegrass sites, the lack of protective cover during treatment increases the potential for soil displacement and transport. Plowing can alter the soil profile by mixing soil layers. From plowing, infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff could increase over natural rates on these sites.

Using the Forest Service WEPP Model, predicted erosion rates at the site-specific level can range from near 0 tons per acre to nearly ten tons per acre based on slope and percent ground

cover. For example, a treated field on a 5 percent slope could have erosion rates ranging from 0 tons to about 1.4 tons per acre, depending on the intensity of precipitation following the treatment. Using this field scenario and assuming up to 750 acres[3] would be in a disturbed condition beginning in year five of the treatment program proposed in this alternative, erosion rates could range from near 0 tons to as much as 1,050 tons per year. If increased runoff and erosion from treated sites causes primary channels to adjust, watershed stability could decrease.

This alternative proposes reducing the amount of upland vegetation utilization by 20 to 30 percent over the current rate. Only Alternative D, which proposes no grazing, has a lower utilization rate. Residual ground cover after grazing would be greater than Alternative A or B, resulting in an overall improvement in watershed condition with reduced potential for runoff and erosion. Microbiotic crusts would be less impacted than in other alternatives, except Alternative D.

Restricting vehicle use to designated routes in this alternative would reduce impacts from "road pioneering." Pioneered roads can cause deteriorated watershed conditions, especially on steeper slopes, where runoff water can concentrate in wheel tracks and ruts and create rills and gullies. Keeping vehicles on maintained roads and trails would reduce overall erosion potential and maintain watersheds in an overall healthier condition.

Watershed conditions within the Grassland are expected to decline somewhat during vegetation treatments, but should improve over the long-term as non-native bulbous bluegrass sites are converted to vegetation types that provide greater ground cover potential.

Overall watershed conditions, including all private and public land, would not be expected to substantially improve without soil conservation efforts and erosion control watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site is degraded until vegetation reestablishes. If microbiotic crusts are burned or trampled, they may no longer be a viable ground cover source. As long as these conditions persist, ground cover would irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass, potential ground cover is less than sites that have native plant species. Watershed condition would be maintained at less than potential in these areas. As long as non-native species, such as bulbous bluegrass, dominate a site, ground cover potential provided by more desirable native and non-native species would be irretrievably lost.

[3] Only those areas burned, brush beaten, or plowed are considered hydrologically disturbed. Acres treated with herbicides are not considered hydrologically disturbed.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which results in increased runoff and erosion potential.

No actions are proposed in this alternative that would cause irreversible effects on watersheds.

Riparian Condition

This alternative proposes to manage riparian areas to maintain those reaches considered to be in good overall condition, or accelerate recovery in reaches considered to be deteriorated condition, and to provide late summer sage grouse brood habitat. Riparian/Wetland Areas (RWAs) would be established using a 150-foot special emphasis zone for riparian and stream channel processes. New livestock facilities would be placed outside RWAs. Riparian livestock utilization levels would be established at 20-50 percent or a two- to six-inch stubble height, based on season of grazing, stream channel type, and riparian conditions. Criteria for bank stability are also included. Approximately 1,500 upland acres would be burned, plowed and reseeded with natives only. An additional 2,500 upland acres would be treated using an herbicide or by brush beating. No treatments are scheduled in riparian areas.

Direct and Indirect Effects:

Based on the type of existing stream channel and the overall existing condition of riparian vegetation, a range of vegetation utilization levels by livestock between 20-50 percent or 2-6 inch stubble height in RWAs would be used to maintain the integrity of riparian areas currently in good condition and improve those areas that are in degraded conditions. Specific allowable bank disturbance parameters would also be implemented. A reduction in total impacts from livestock grazing would be expected, and the potential for improving degraded stream channels and riparian areas would be greater in this alternative than in Alternatives A and B. Rehabilitating three miles of degraded stream banks by establishing or supplementing deep-rooted vegetation would improve riparian vegetation and stabilize stream banks on these sites.

The riparian pasture along South Fork Rock Creek should help reduce the overall sediment loading of this 303(d) water quality limited stream. Specific guidelines for allowable streambank disturbance and lower livestock utilization rates proposed in this alternative should reduce sediment loading to a level that meets the state's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams throughout the grassland would improve as grazing impacts to riparian areas and stream channels are reduced. Allowable uses and disturbances become more restrictive as inherent channel resiliency and channel/riparian functioning condition decrease. This alternative meets the intent of the Clean Water Act and Idaho's antidegradation policy.

Comprehensive riparian impact standards and guidelines proposed in this alternative should result in overall improvements to riparian vegetation, followed by improvements to overall channel condition within a few years. Streams that have been assessed at properly functioning condition or functioning-at-risk would recover first. More degraded channels assessed as functioning-at-risk to nonfunctioning would require more time to heal. Channels that have been deeply downcut may take decades to recover as evolutionary processes stabilize the channel.

Upstream influences, particularly from farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence downstream channel stability and riparian vegetation growth.

Effects on water quality and channel stability from upland vegetation treatments can range from non-measurable to considerable depending on treatment location and the condition and channel type of the receiving stream. (See Watershed discussion under Alternative C.) In most cases, slopes within the Grassland are generally less than 20 percent, with many less than 4 percent. Runoff increases on these more gentle slopes would be less than the amount potentially produced from steeper slopes. A decrease in potential runoff would result in a corresponding decrease in potential sediment. Expected erosion rates from treated areas can range from near 0 on flat slopes with ground cover greater than 60 percent, to as much as seven tons per acre above current rates on 20 percent slopes with no ground cover following a heavy precipitation event.

Vegetation treatments that include plowing have the potential to increase runoff and downstream sediments. Sediment loading could cause substantial impacts to downstream water quality, depending on the location of the treatment and the amount of erosion and sediment delivery that occurs as a result of the treatment. (See Watershed discussion under Alternative C.) Increases in water yields and sediment would be expected to occur two to five years following treatment, with the greatest increases occurring during the first year following treatment.

Brush beating produces mixed effects on the watershed. On one hand, if roots are ripped up, the amount of bare soil exposed to erosive processes can increase, and increases in downstream sediment delivery could be possible. On the other hand, as brush is beat down, temporary increases in ground cover can occur, which would assist in reducing overall erosion rates. These increases in ground cover would be relatively short-term, lasting until leaves and small stems dry up. Larger stems would remain on-site over a longer period of time, but their effectiveness in protecting the soil and reducing erosion would be marginal. No nutrient or chemical loading of downstream waters would be expected from brush beating treatments.

Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases are relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions. No significant water quality problems should occur from the application of herbicides when they are used to reduce sagebrush canopy. No State or Federal water quality standards should be exceeded. No threats to human, animal, insect or aquatic biota should result from treatments if chemicals are applied properly.

Long-term improvements in overall water quality would be realized over current conditions. If any streams within or directly adjacent to the Grassland are listed under Section 303(d) of the Clean Water, grazing standards would be sufficient to reduce grazing impacts and improve degraded water quality conditions within the Grassland boundary. Impacts from proposed vegetation treatments would need to be evaluated on a site-specific, project-by-project basis.

The Grasslands occupy only a small percentage of the total Deep Creek and Rock Creek Watersheds. Impacts from other land ownership would play a primary role in the success of any

improvements made within the Grassland. Marginal improvements in overall water quality may be expected for the watersheds.

A total of twenty-four miles of stream would improve substantially toward a trend of Properly Functioning Condition. The rate of movement would be faster than Alternative A or Alternative B with the implementation of specific riparian vegetation use and bank disturbance criteria.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and acceptable water quality would be irretrievably lost as long as degraded system conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area would be dependent on the extent of the degradation and the corrective actions taken.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to pre-disturbance conditions. Through prudent management practices, some of these channels could be stabilized in their existing state; however, to be fully functional, many of these channels would have to undergo an evolutionary process that could take decades. In these cases, historical channel conditions are no longer achievable, which would be an irreversible and irretrievable commitment of this resource.

•Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

The effects the proposed treatments in this alternative would have on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

Direct and Indirect Effects:

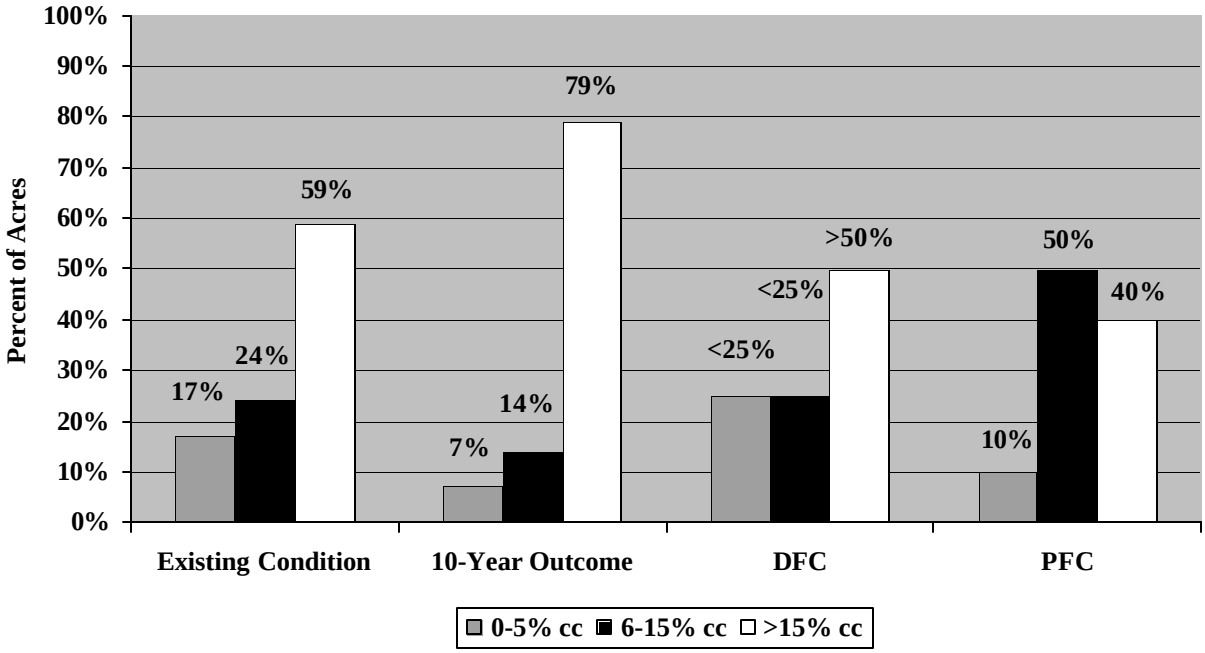
Curlew National Grassland

Alternative C proposes to treat 4,000 acres of sagebrush over the next ten years to improve habitat for sagebrush dependent wildlife species and to improve brood-rearing and nesting habitat for sage grouse. Approximately 2,500 sagebrush acres in the greater than 25 percent canopy cover class would be treated with herbicides to thin canopy cover to the 15-25 percent canopy cover class. An additional 1,500 sagebrush acres in the less than 15 percent canopy cover class, where bulbous bluegrass dominates the understory, would be treated using a

combination of brush beating/prescribed fire, plowing, and reseeding with a native only seed mix. Treatments would range in size from 50 acres to 500 acres.

Figure 4.9 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, and the percent of acres in each canopy cover once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.9. Alternative C
Changes in Sagebrush Canopy



From Prevedel's 1997 GIS assessment and VDDT Model

Proposed treatments and natural succession in this alternative would decrease the number of sagebrush acres in the 0-5 percent canopy cover class about 10 percent over the ten-year plan period. The number of sagebrush acres in the 6-15 percent canopy cover class would reduce by about 10 percent, also. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by about 20 percent.

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.31.

Table 4.31. Alternative C. Ten-Year VDDT Model Outcomes on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	7%
6-15% canopy cover	14%
16-25% canopy cover	26%
>25% canopy cover	53%

The ten-year projected outcome of treatments proposed in this alternative would achieve the long-term goal for sagebrush canopy cover. Future management, beyond the first decade, would require additional treatments on sagebrush acres in the greater than 15 percent canopy cover class to increase the number of sagebrush acres in the 6-15 percent canopy cover class.

Over the long term (50 to 100 years), succession and treatments in following decades would trend the sagebrush cover type on the Grassland toward a late seral stage on the majority of sagebrush acres.

The sagebrush cover type would not meet PFC criteria in the short term. As treatments and succession continue over the long term (50 to 100 years), sagebrush acres would trend farther away from PFC criteria for structure, composition, disturbance regimes, and patterns. Sagebrush acres, regardless of percent canopy cover would not meet PFC criteria under this alternative. Larger more intense wildfires could be expected under this alternative over time.

Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

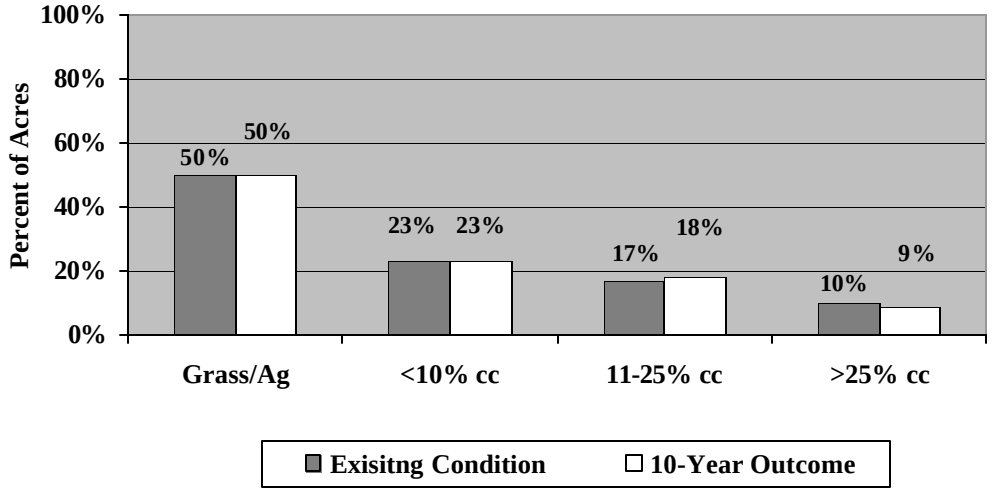
Managing Grassland resources under Alternative C would maintain the sagebrush system at a **moderate** to **high** magnitude of departure from the historic range of variation. This degree of departure would be greater than in Alternative A. The potential for reduced resiliency and ability to recover after disturbance in the sagebrush system would be higher in this alternative than in Alternative A. The sagebrush system's resiliency and ability to recover after disturbance would continue to decline over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would maintain the number of sagebrush acres in this canopy cover class. The Greater Curlew Valley Area would remain outside PFC criteria because agricultural practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria.

Figure 4.10 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.10. Alternative C
Greater Curlew Valley Ares
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection on sagebrush canopy cover classes

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irretrievable or irreversible effects have been identified in this alternative.

Mountain Brush

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative does not identify any mountain brush acres for treatment. The effects will be similar to mountain brush effects discussed in Alternative A.

Vegetation Understory Composition

No prescribed fire treatments are proposed outside of bulbous bluegrass sites in this alternative. Existing understory vegetation on untreated crested wheatgrass and native range sites would continue to decline in diversity and vigor as sagebrush canopy cover increases over time. Cheatgrass sites or other species that rapidly invade after prescribed fire treatment would not be disturbed in this alternative.

Direct and Indirect Effects:

Using herbicides to thin sagebrush in greater than 25 percent canopy cover to achieve a 15-25 percent canopy cover would have a minimal effect on understory composition. It is not expected that understory composition would change to any great degree on crested wheatgrass sites. Production could increase as more moisture and nutrients become available in the soil and with less competition from the brush component. Limiting treatments to 500 acres or less would have little effect on the understory on these sites.

Bulbous bluegrass treatments would enhance understory production and diversity on approximately 1,500 acres currently dominated by this species. In this alternative a seed mix of native grasses, forbs and shrubs would be used for restoration on these sites. Production would increase over current production levels, once bulbous bluegrass is eliminated. Native grasses, forbs and shrubs would produce more forage per acre than bulbous bluegrass, but less than sites dominated by crested wheatgrass or other higher producing non-native species. Understory diversity also would be enhanced on treated bulbous bluegrass sites with the introduction of native forbs and grasses in the seed mix. Including native sagebrush or other native shrub seeds in the seed mix would stimulate shrub re-establishment on these sites more rapidly than if brush established naturally from adjacent sites over time. As shrub types become established and canopy cover increases, herbaceous production would decline.

Constrained treatment sizes in this alternative could result in the creation of small patches of native vegetation mixed with bulbous bluegrass and crested wheatgrass. Patches of bulbous bluegrass in the 0-5 percent canopy cover class range in size from ten acres up to 470 acres. Where bulbous bluegrass dominates sagebrush in the 6-15 percent canopy cover class, patch size ranges from thirty acres to 180 acres. These small bulbous bluegrass patches may be adjacent to other untreated areas where the canopy cover is denser and the understory is primarily composed of non-natives. If only small areas are treated, overuse by livestock is likely to occur on restored sites. As the diversity and palatability of understory species increase after treatment, grazing animals would select these sites, because they offer diversity not generally available on other sites. These sites would also tend to green up earlier and have higher nutritional values. As a result, grazing animals would graze these sites first before returning to other less palatable vegetation (Heitschmidt and Walker). Selective grazing is a key factor that affects the rate, direction, and magnitude of ecological succession, because the competitive ability of individual plants is altered by the frequency and severity of defoliation. If these sites are overgrazed, an invasion of annuals and other non-desirable plants could be expected. Where small, treated areas are adjacent to or intermingled with untreated bulbous bluegrass or crested wheatgrass sites, invasion by these species would occur as native plants become stressed or lose vigor and production (Harrison, 1996).

This alternative proposes 30-40 percent use on all upland plants or a seven-inch stubble height and a 20-50 percent use rate or two- to six-inch stubble height in riparian areas.

On non-native plants, the effects of livestock grazing would be exacerbated at this lower use rate. Grazing capacity on crested wheatgrass sites would be reduced at a faster rate as wolf plants developed more quickly. The increased vigor expected from the relatively low use rate for these species could actually hasten their invasion into native communities and exposed bare soils.

On native sites, this level of grazing use would provide for improved ecological conditions and upward vegetative trends as plants increase in vigor and more litter remains on site. Production could increase as more desirable plants germinate over time and succession accelerates, assuming that shrub canopy cover does not become dense enough to restrict the understory.

In riparian areas, a higher level of use was assumed to be sustainable on streams in properly functioning condition, because of the existing riparian vegetation and the availability of water. At this level of use, it is assumed that succession would trend to more middle and late seral species that are deep-rooted and more desirable for aquatic habitat. It is assumed on streams that are "functioning-at-risk" or non-functioning, lower use levels would be established until the stream reaches a properly functioning condition.

This alternative provides the opportunity to improve understory diversity on 1,500 acres. All treatments in this alternative would be restored with native plants only. Approximately 3,000 acres of untreated bulbous bluegrass would remain at the end of the ten-year plan period. Understory diversity would remain unchanged and forage production would remain low on these acres.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The current loss of forage on bulbous bluegrass sites would be an irretrievable loss while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with them could also be causing an irretrievable effect yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation reestablishes.

Wildlife Habitat Management

Direct and Indirect Effects:

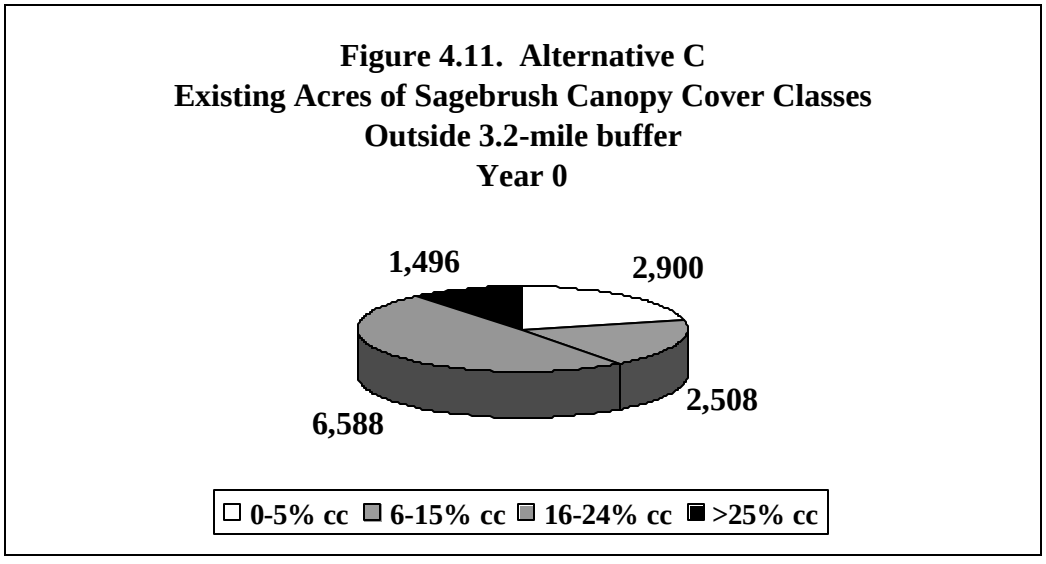
Effects on Sagebrush Habitat

This alternative proposes a 3.2-mile buffer around known lek locations, except for bulbous bluegrass treatments. Vegetation treatments would not be permitted inside buffer zones, unless the treatment would improve the quality and quantity of suitable sage grouse habitat as defined by the guidelines for sage grouse management. As a result, only 25 percent of the Grassland would be available for vegetation treatments outside the buffer zones.

Table 4.32. Alternative C. Changes in Percentage of Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	7%	50%	50%
6-15% cc	24%	14%	23%	23%
16-24% cc	42%	26%	17%	18%
>25%	17%	53%	10%	9%

Figure 4.11 displays the existing distribution of sagebrush canopy cover classes outside the 3.2-mile buffer proposed in this alternative.



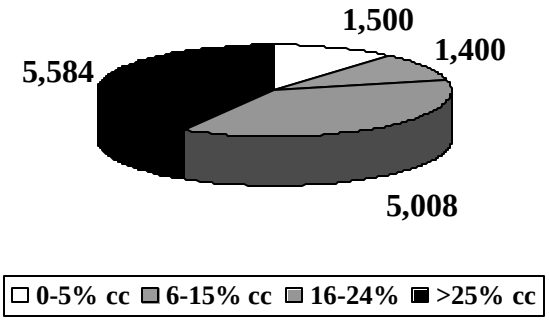
Alternative C proposes light herbicide treatments on 2,500 acres in the greater than 25 percent canopy cover to reduce canopy cover to 16-25 percent. Outside of the buffer zones, only about 1,500 acres are in the greater than 25 percent canopy cover. It is assumed all acres outside of buffer zones would be treated first before any treatment would occur within the buffer zones.

The additional 1,000 acres of herbicide treatment would occur within the buffer zone if treatment proposals meet habitat requirements in the sage grouse guidelines. Herbicide treatments in canopy cover greater than 25 percent would reduce canopy cover to 16-25 percent, improving nesting habitat. Herbicide treatments would result in patchy sagebrush stands of more diverse canopy covers, rather than eliminating canopy cover completely.

Using 1991 lek location data, all bulbous bluegrass areas fall inside the 3.2-mile buffer. Treatment would include prescribed fire, followed by plowing and reseeding with native only seed mixes. Treatments would improve understory diversity over time but would be unavailable for nesting habitat due to the loss of sagebrush overstory for twenty-five to thirty years. Treatment areas would be dispersed across the landscape, but could reduce existing large patches. Patches of sagebrush in greater than 15 percent canopy cover in 320-acre patches would remain at nineteen patches.

Figure 4.12 displays an estimation of the results of treatments on canopy cover classes in Year 10 on the acres outside of buffer zones. Figure 4.12 does not necessarily represent true on-the-ground conditions in Year 10. It is used as a tool to show differences between alternatives only.

Figure 4.12. Alternative C
Estimated Acres of Sagebrush Canopy Cover
Outside 3.2-Mile Buffer
Year 10



Treatments of less than 500 acres, but greater than 320 acres, would provide for some diversity of successional stages and would not be detrimental to the overall habitat requirements of sagebrush obligate wildlife species.

Effects on Riparian Species

In this alternative riparian areas would be managed to include a 150-foot special emphasis area (Riparian Wetland Area) on either side of the stream. These RWAs would provide an improvement in the availability and quantity of riparian wildlife habitat. An increase in available habitat would increase brood-rearing habitat and survival of sage and sharp-tailed grouse by

providing ample amounts of succulent vegetation and insects. Other riparian related wildlife species, particularly songbirds, would also benefit from this action over the long term.

Livestock utilization levels in riparian areas would be established between 20 to 50 percent or two-six-inch stubble height, depending on season of grazing, stream channel type, and current and desired riparian condition. Because no absolute standard would be set for a minimum residual vegetation height in riparian zones, effects on riparian species would vary depending on stream and riparian condition at the site-specific level. The higher utilization rate would most likely be established if the stream is in properly functioning condition. Higher utilization rates, regardless of stream condition, would not provide suitable habitat for ground-nesting, non-game birds due to the reduction in security cover. Lower utilization rates, may provide an opportunity over the long-term to provide better or increase the extent of riparian habitat, regardless of stream condition, by retaining sufficient height of forbs and grasses for ground nesting and feeding after the grazing season. A utilization of 20 percent should provide a residual vegetation height of more than six inches.

Vegetation conditions would be expected to improve over existing conditions. Improving streamside vegetation by establishing three miles of stream reach with deep-rooted vegetation (sedge and willows) would improve habitat along these reaches. Riparian areas in riparian pastures and exclosures and those reaches in proper functioning condition would continue to provide habitat for breeding birds and other species. Those reaches that are functioning-at-risk may experience a slow increase in woody vegetation and native sedges. The non-functioning reaches may see no change in willow establishment by the end of ten-year plan period.

Table 4.33. Alternative C. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would increase moderately above currently low levels.
How well the alternative meets conservation measures	This alternative moves towards conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to increase slightly. Distribution should improve over the Grasslands, but still not moving towards the potential distribution.

Effects on Sagebrush Species (except Sage grouse)

Treatments and succession in this alternative would shift the distribution of sagebrush canopy cover classes, resulting in more acres in the greater than 15 percent canopy cover class with fewer acres in the 0-5 percent and 6-15 percent cover classes. This shift in acres would not meet PFC criteria for the sagebrush type. As more acres shift into the denser canopy covers, a reduction would be expected in available habitat for species associated with more open sagebrush stands, such as the short-eared owl and long-billed curlew on the Grassland.

Avian sagebrush-associates generally nest on the ground under a shrub or in the sagebrush canopy. The impact of treatments on their production would be minimal. Nests that are constructed in taller sagebrush plants could be affected by sagebrush removal on bulbous

bluegrass sites. A reduction could occur in production of these species on treated areas but overall suitable habitat is increasing. Other wildlife species that do not require sagebrush for nesting would benefit from bulbous bluegrass treatments, because treatments should result in more diverse array of successional stages that would better meet their habitat and life cycle needs.

The lower utilization would result in increased residual vegetation height at the end of the grazing season. An increase in residual vegetation height would beneficial to other wildlife species by improving nesting success and brood survival of species using the grassy understory for foraging or cover.

Table 4.34. Alternative C. Effects on Sagebrush Habitat and Species

SPECIES	EFFECTS
Short-eared owl	A 10% decrease would be expected in suitable habitat over the Grassland, and a stable amount over the GCVA, based on sagebrush overstory. Utilization levels of 30-40% are predicted to be adequate to increase suitable habitat for voles. Populations of short-eared owls would be expected to decrease over the Grassland but would stay stable over the GCVA.
Long-billed curlew	A 10% decrease would be expected in suitable habitat over the Grassland, and a stable amount over the GCVA, based on sagebrush overstory. Utilization levels of 30-40% would result in decreased areas of suitable habitat for nesting, while vegetation treatments would tend to increase it. Populations of long-billed curlew would be expected to decrease over the Grassland but stay stable over the GCVA.
Columbian sharp-tailed grouse	Approximately 93% of sagebrush acres would remain in greater than 5% canopy cover. Bulbous bluegrass treatments would be reseeded with native seed mixes so understory diversity should improve on 1,500 acres. Utilization levels of 30-40% will increase overhead nesting cover and would be expected to increase nesting success. Populations of sharp-tailed grouse would be expected to remain at current levels over the Grassland and GCVA.
Pygmy rabbit	A 20% increase would be expected in suitable habitat over the Grassland, and a 1% decrease over the GCVA, based on sagebrush overstory. Fragmentation would not increase, with the number of sagebrush patches greater than 320 acres in denser stands remaining at 19. Bulbous bluegrass treatments would be reseeded with native seed mixes so understory diversity should improve on 1,500 acres, but would not be suitable for pygmy rabbits for 20-25 years (until sagebrush density reaches at least 15%). Populations and distribution would be expected to improve over the Grassland and stay the same over the GCVA.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative would protect suitable sage grouse habitats within 5 km (3.2 miles) of all occupied leks. Any vegetation treatments within buffer zones must maintain or restore breeding habitats.

Over the ten-year plan period, sagebrush would be managed to provide 79 percent of the sagebrush acres in greater than 15 percent canopy cover. Approximately 2,500 acres in the greater than 15 percent canopy cover would be treated with light herbicides to reduce canopy cover to 15 percent or less. Herbicide treatments could result in an improved understory with retention of suitable overstory. An additional 1,500 acres in the less than 15 percent canopy cover class would be treated by burning, plowing and reseeding with native species to eradicate bulbous bluegrass in the understory. The method of treatment requires about five years, depending on site-specific conditions and other variables. The acres under treatment would not meet the understory requirements for several years and would not meet the sagebrush canopy cover guideline for at least twenty-five to thirty years or until sagebrush canopy cover reaches 16 percent.

The desired future condition described in this alternative would not meet the overstory recommendations in this guideline over 50 percent of the area. However, over the ten-year plan period, the amount of acres in the greater than 15 percent canopy cover class would increase. This is more than all the other alternatives, except Alternative D. An increase in the number of acres in greater than 15 percent canopy cover could increase production of sage grouse, and, consequently, population numbers could also increase. Sharp-tailed grouse, being more of a generalist, would not likely experience declines as a result of treatments in this alternative.

Improvement of understory would occur as a result of both the treatments, and the lower utilization levels. The lower utilization would result in an increase in residual vegetation height remaining after the grazing season. This level would have about 75 percent of the height of the plants remaining after the grazing season. This lower utilization would best meet the guideline criteria. . Any increase in residual vegetation height would improve nesting success and brood survival for sage and sharp-tailed grouse and be would more beneficial to other wildlife species.

This alternative best meets this guideline.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

Travel plan proposals in this alternative would provide a slightly more restrictive travel than Alternatives A and B. Snow-free season travel would be restricted to designated routes year round. Restricted travel during breeding could reduce disturbance to displaying and nesting grouse and slightly increase nesting. This alternative will also close several unauthorized roads that are currently being used by motorized vehicles. A slight reduction in some disturbance of leks and nest sites could be expected

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation and livestock grazing, can result in one or all of the above conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed and Understory Vegetation sections under Alternative C, respectively, for more discussion on the expected changes from treatments proposed in this alternative.) This section summarizes how this alternative meets the guideline. An improvement in understory composition would be expected as a result of the treatments. Using native seeds on treated bulbous bluegrass sites would provide a greater variety in understory composition and a more suitable environment for insects desired by many wildlife species. Herbicide treatments would retain sagebrush canopy and improve understory diversity. This alternative would best meet this guideline.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Winter cover could be slightly reduced in this alternative but not as significantly as the other alternatives, with the exception of Alternative D. Even though most of the treatments will occur in winter habitat, the herbicide treatments would not completely remove the overstory. Effects would depend on the size and location of treatments relative to other disturbances, spatially or temporally.

Overall Compliance with Sage Grouse Guidelines

Alternative C would best meet the sage grouse guidelines. Treatments would result in an increase in acres in the greater than 15 percent canopy cover. Livestock utilization levels would be expected to retain adequate vegetation or increase remaining vegetation at the end of the grazing season. Improvements in understory diversity would be expected on treated bulbous bluegrass sites using native seeds only for restoration. A reduction in the potential for disturbance to breeding or nesting birds would be expected with changes in travel management.

Miles of Tree Rows at End of Decade

The effects would be the same as those discussed in Alternative B.

Cumulative Effects:

Seep 4-197 and 4-202.

Irretrievable/Irreversible Effects:

The loss of 1,500 acres of sagebrush in less than 15 percent canopy cover would be considered an irretrievable loss of long-term habitat for sage grouse nesting. Treatments would interrupt natural succession and reduce canopy cover to 0-5 percent for about fifteen years. The loss would continue until sagebrush reestablishes and reaches at least 6-15 percent canopy cover.

Loss of native understory from other management activities or permitted uses would result in an irretrievable loss of production for ground-nesting and ground-foraging birds on an annual basis. Loss of understory for sharp-tailed grouse nesting would occur for a minimum for five years while bulbous bluegrass sites are being treated and until vegetation reestablishes on the site.

· Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Direct and Indirect Effects:

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative C proposes 46,475 acres as suitable for livestock grazing. Based on these acres and the 30-40 percent utilization level and vegetation treatments proposed in this alternative, calculations for estimated forage production and head months were made for the existing situation (Year 0) and Year 10.

Treatments in this alternative focus on providing older sagebrush canopy cover classes for sage grouse and other sagebrush obligate species. Treatments are designed to maintain canopy cover while allowing livestock grazing.

Calculations for estimated forage production indicate head months at proposed utilization levels in this alternative would range from 11,400 to 16,200 compared to the 21,400 head months currently permitted.

Table 4.35. Alternative C
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	38.4 M	11,400-16,200	(-)
Year 10	30.7 M	9,900-13,200	(-)

1 Shown in millions of pounds. Acres include all vegetation – sagebrush, mountain brush and riparian.

During the ten-year plan period, forage production would decrease from about 38.4 million pounds to about 30.7 million pounds. More acres would be maintained in the greater than 15 percent canopy cover at the end of the ten-year plan. As production declines, an additional decrease in head months from Year 0 would be necessary to maintain livestock grazing at sustainable levels.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if treatments were continued, forage production would most likely decrease as sagebrush canopy cover increases. As a result of continuing this level of light herbicide treatment, all acres would move into the greater than 15 percent canopy cover class, at which time, forage production would stabilize at about 500 pounds per acre per year. As production declines, permitted numbers would need to be adjusted to sustain vegetation over the long-term.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Reduced utilization levels and treatments proposed in this alternative would result in an irretrievable loss of grazing head months over the ten-year plan period.

In addition, treatments on bulbous bluegrass sites are more extensive and have longer recovery periods. In this alternative an average of 750 acres would be unavailable for grazing during the treatment cycle over the ten-year plan period. The loss of head months on these acres would be irretrievable during the treatment period or until grazing resumes.

Grazing would continue on the 2,500 acres treated with herbicides. No irretrievable loss of head months would occur on these acres.

No irreversible effects have been identified for this alternative.

Alternative D

Summary Description of Treatments

In order to reach the long-term goals in Alternative D, livestock grazing would not be permitted under this alternative.

Under Alternative D vegetation treatments would be implemented only when necessary to improve habitats to maintain minimum viable populations of wildlife species. Prescribed fire would be the primary management tool used to achieve improvements of habitats to maintain minimum viable populations of wildlife species. The majority of sagebrush acres are left to evolve under natural processes (with the exception of wild fire). Sagebrush acres are managed to trend successionally to older structures and composition. No long-term goals for treatment of sagebrush canopy cover are proposed in this alternative.

Table 4.36 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.36. Alternative D
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome Percent of Sagebrush Acres	Desired Future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	6% of acres	Trend to
6%-15% canopy cover	24% of acres	15% of acres	late seral through
>15% canopy cover	59% of acres	79% of acres	natural succession

No treatment of mountain brush is proposed in this alternative.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

●Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative D does not identify any vegetation treatments. Livestock grazing would not be permitted.

Plants, both native and non-native would grow at natural rates. Overall ground cover would improve as livestock grazing is eliminated. Livestock effects on soils (compaction) and microbiotic crusts would be eliminated. Watershed stability would improve as a result of increased ground cover and improved soil conditions. Soil infiltration would improve overall as hoof compaction from livestock is eliminated. Runoff and erosion would be maintained within natural rates. Overall watershed condition would improve over the shortest period of time of any of the alternatives, since livestock grazing and major vegetation treatment impacts would be eliminated.

Vegetation treatments would be permitted only to maintain viable wildlife populations. Ground cover would improve over time. Non-native sites, such as bulbous bluegrass, would continue to provide less than 60 percent ground cover and would continue to be a source of increased erosion and sediment. Native and desirable non-native sites, where ground cover is currently less than 60 percent, would recover over time.

Recreation and roads effects would be the same as Alternative C.

Overall watershed conditions, including all private and public land, would not be expected to substantially improve without soil conservation and erosion control efforts watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

On sites dominated by non-native species, specifically bulbous bluegrass areas, potential ground cover would be less than sites that have native plant species. Watershed condition would be maintained at less than potential in these areas. As long as non-native species dominate a site, ground cover potential of native sites would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which results in increased runoff and erosion potential.

No irreversible commitment to the watershed resource has been identified for this alternative.

Riparian Condition

Alternative D proposes no livestock grazing. No defined Riparian/Wetland Areas (RWAs) would be established. Vegetation would be allowed to evolve under natural processes based on the existing condition of the vegetation and watersheds today. Vegetation treatments would be implemented only to maintain viable populations of wildlife species.

Direct and Indirect Effects:

In this alternative, riparian vegetation would be allowed to grow unaffected by livestock grazing.

Substantial improvements in the vigor of existing streamside vegetation would occur during the first few growing seasons without livestock grazing. Vegetation that has been suppressed or has an available seed source on-site would begin to grow or reestablish. Woody vegetation, such as willows, would become established if they are present but have been suppressed.

South Fork of Rock Creek is a State 303(d) water quality limited stream. By eliminating livestock grazing on the Grassland, that portion of South Fork of Rock Creek within the Grassland, would improve the quickest of all alternatives. However, water quality would continue to be affected by upstream agricultural activities. Water quality in the remainder of the streams throughout the Grassland would improve as channel and riparian conditions improve. This alternative meets the intent of the Clear Water Act and Idaho's antidegradation policy. As the quantity and quality of vegetation increases over time, bank scouring and sediment loading should be reduced. The filtering capacity of riparian vegetation would increase as vegetation becomes established. Upslope runoff would be filtered by riparian vegetation reducing the amount of sediment, nutrients and bacteria reaching the stream channel, resulting in improved water quality.

Following the improvement of streamside vegetation, stream channel condition would improve. Streams that have been assessed in properly functioning condition or functioning-at-risk would improve first. More degraded channels, i.e., those assessed as functioning-at-risk to nonfunctioning, would require more time to heal. Channels that have been deeply downcut may take decades to recover as evolutionary processes stabilize the channel. Upstream influences, particularly from agricultural farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence overall channel stability and vegetation growth.

Impacts from other land ownership would play a primary role in the success of any improvement on the Grassland, even with minimal disturbance on Forest Service administered areas proposed in this alternative. Marginal improvements in overall water quality may be expected for the watersheds as a whole.

A total of twenty-four miles of stream would be greatly improved and would trend streams toward a more Properly Functioning Condition. The rate of recovery would be much faster than Alternative A, Alternative B, or Alternative C with the elimination of grazing and few, if any, vegetation treatments in this alternative.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality would be irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area would be dependent on the extent of the degradation and the corrective actions taken.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to pre-disturbance conditions. Through prudent management practices, some of these channels could be stabilized in their existing state; however, to be fully functional, some of these channels would have to undergo an evolutionary process that could take decades. In these cases, pre-disturbance channel conditions are no longer achievable which would be an irreversible and irretrievable commitment of this resource.

●Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

The effects treatments in this alternative would have on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

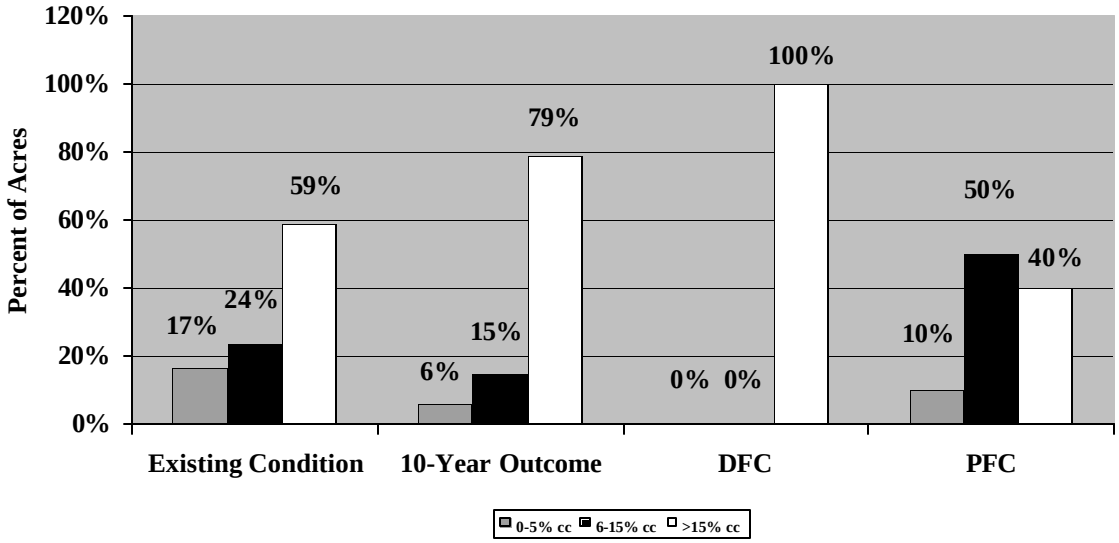
Direct and Indirect Effects:

Curlew National Grassland

This alternative proposes to manage the Grassland as a reference reserve/preserve and would allow most of the sagebrush acres on the Grassland to evolve under natural processes. Over time, all sagebrush acres would succeed toward late seral structure and composition. Wildfire would be suppressed. Prescribed fire treatments would be initiated only when necessary to maintain habitat for minimum viable populations of wildlife species. No long-term goals are set for sagebrush canopy cover classes in this alternative.

Figure 4.13 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, and the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.13. Alternative D
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and VDDT Model

Natural succession in this alternative would decrease the number of sagebrush acres in the 0-5 percent sagebrush canopy cover class about 11 percent over the ten-year plan period. The number of sagebrush acres in the 6-15 percent canopy cover class would decrease by about 9 percent. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by 20 percent.

The ten-year outcome results from the VDDT model show the percent of Grassland Acres in each sagebrush canopy class in Table 4.37.

Table 4.37. Alternative D. Ten-Year VDDT Model Outcomes on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	6%
6-15% canopy cover	15%
16-25% canopy cover	26%
>25% canopy cover	53%

The ten-year projected outcome of this alternative would allow natural succession to continue to trend sagebrush acres toward a late seral stage.

Over the long term (50 to 100 years), succession in following decades would move all sagebrush acres into a late seral stage.

The sagebrush cover type on the Grassland would not meet PFC criteria in the short term. As succession continues over the long term (50-100 years), sagebrush acres would trend farther away from PFC criteria for structure, composition, disturbance regimes and patterns. Sagebrush acres, regardless of percent canopy, would not meet PFC criteria under this alternative. Larger and more intense wildfires would be expected under this alternative.

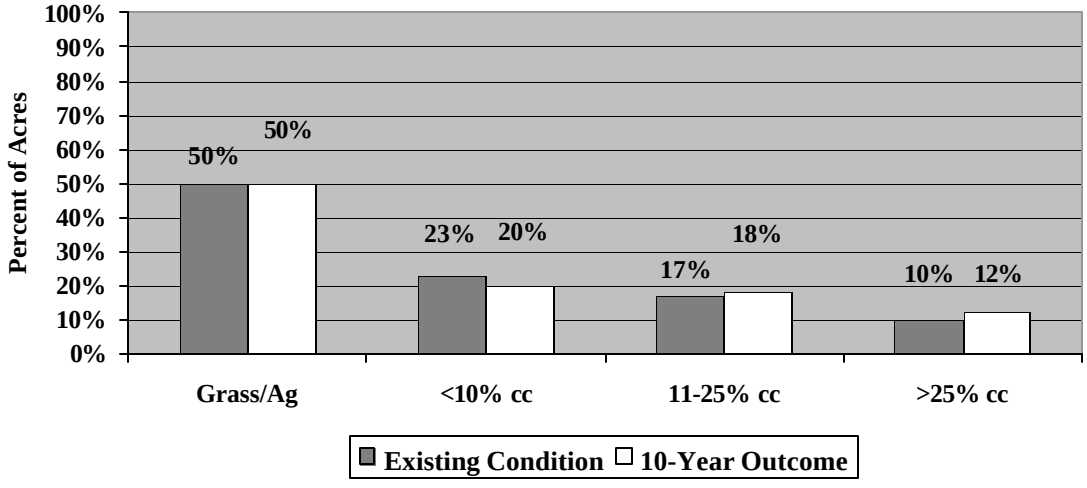
Managing Grassland resources under Alternative D would maintain the sagebrush system at a **moderate** to **high** magnitude of departure from the historic range of variation. This degree of departure would be similar to Alternative C and greater than Alternative A. The potential for reduced resiliency of the sagebrush system would be higher in this alternative than in Alternative A. A reduction in the system's resiliency and ability to recover after disturbance would continue to occur over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would increase the number of sagebrush acres in this canopy cover class by about 10 percent over the long-term. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural practices would prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria.

Figure 4.14 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.14. Alternative D
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irreversible or irretrievable effects have been identified for this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative does not identify any mountain brush acres for treatment. The effects will be similar to mountain brush effects discussed in Alternative A.

Vegetation Understory Composition

Direct and Indirect Effects:

A loss of production and an increase in bare ground would be expected as sagebrush canopy cover increases in this alternative over time. On crested wheatgrass sites, research studies have shown that for every 1 percent increase in sagebrush overstory, production in the understory drops by 4.5 percent (Rittenhouse and Sneva). Other studies show that sagebrush can have a detrimental effect on surface soil moisture. The sagebrush root system includes a taproot that draws deep soil moisture and a lateral root system that draws water near the surface. As a result, understory production can be limited by the presence of sagebrush. As the sagebrush canopy cover gets denser, the understory declines in productivity. Crested wheatgrass, because of its root system, generally outcompetes bluebunch wheatgrass when both are competing with sagebrush on a site. As a result, sagebrush establishment on crested wheatgrass sites would occur more slowly than sagebrush establishment on native vegetation sites. Bulbous bluegrass coexists with sagebrush and would not be affected as sagebrush canopy cover increases in density.

This alternative would have no grazing. Under this type of management, bulbous bluegrass would remain as a static community under the shrub layer and probably show no change until the shrub layer was removed such as through wildfire. There could be a loss of some herbaceous production as the canopy closed in.

On the estimated 30,400 acres of crested wheatgrass, a lack of grazing use would occur on crested wheatgrass, a species planted specifically for forage for permitted livestock. Plants would become wolfy over time, production would drop, and fuels would increase. No change in understory composition would be expected, but with a reduction in understory vigor, shrub density might increase more rapidly.

On native vegetation sites, a faster rate of change toward a late seral stage could be expected. Vigor, reproductive capacity, and the growth of more desirable species would be expected. Herbaceous production would increase. Understory vigor could reduce or maintain the rate of increase in shrub density.

In the riparian areas, the vegetation would be expected to trend towards a high seral community over time. Composition would trend to more desirable riparian plants and the aquatic habitat would improve as natural processes were restored.

This alternative would cause a loss of production, diversity, and vigor in the understory as sagebrush canopy cover increases in density. No understory acres would improve in this alternative. A total of 5,200 acres of bulbous bluegrass would remain untreated at the end of the ten-year plan period.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of forage on bulbous bluegrass sites is irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with them would also be causing an irretrievable effect yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances have been altered. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation re-establishes.

Wildlife Habitat Management

Direct and Indirect Effects:

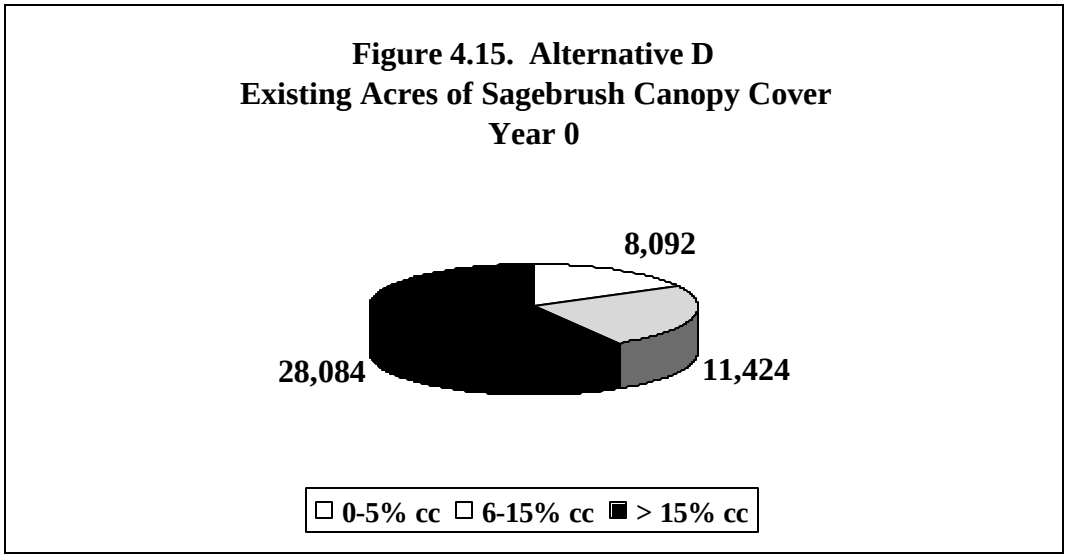
Effects on Sagebrush Habitat

Effects on habitat would be most similar to Alternative C. No acres would be treated unless necessary to maintain viable wildlife populations. Sagebrush acres would continue to succeed toward denser canopy cover and late-seral conditions. In the long-term, as canopy cover closes, understory vegetation that provides food and security cover for wildlife would decline in vigor and production. Without treatments all sagebrush stands would continue to move into denser canopy cover classes and there would be no 0 to 5 percent canopy cover class at the end of ten years.

Table 4.38. Alternative D. Changes in Percentage of Acres in Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

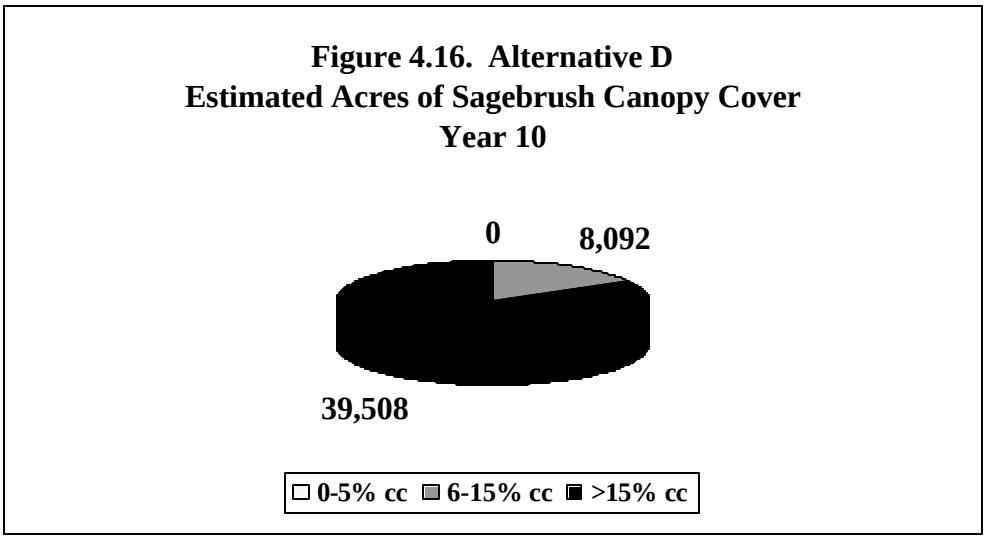
Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	6%	50%	50%
6-15% cc	24%	15%	23%	20%
16-24% cc	42%	26%	17%	18%
>25%	17%	53%	10%	12%

Figure 4.15 displays the existing distribution of sagebrush canopy cover classes on the Grassland in Year 0.



No vegetation treatments are proposed in this alternative and all of the nineteen habitat patches greater than 320 acres in sagebrush canopy cover greater than 15 percent would be retained over the ten-year period. Fragmentation would decrease and connectivity would increase.

Figure 4.16 displays an estimation of the distribution of sagebrush canopy cover classes in Year 10 as a result of natural succession.



Effects on Riparian Species

Sage and sharp-tailed grouse use riparian areas for late spring and early summer brooding habitat, because of succulent vegetation and insects that are available. Suitability for this use would increase substantially under this alternative.

The riparian zone would be left to evolve naturally without livestock grazing. Adjacent land use and precipitation events would influence stream channel stability, riparian vegetation and water quality. Over time, riparian areas would begin to provide a more vigorous and productive riparian vegetation zone for wildlife species. Security cover for broods in late summer would improve. An increase in brood survival could be expected as the quality and quantity of brood rearing habitat improves.

Existing willow communities would continue to provide breeding habitat while suppressed willows would re-sprout where they exist. Shrub establishment would be expected to increase and expand providing a multi-layered shrub zone. This would provide higher quality habitat for birds present and should increase species diversity by providing nest sites for birds using shrubs, as well as improving habitat for those species nesting on the ground. This alternative would result in the greatest improvement for riparian-associated species.

Table 4.39. Alternative D. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would increase above currently low levels. This alternative would see the greatest improvements in habitat, but is limited by the potential of the stream reaches and willow habitats to substantially improve over the 10-year period.
How well the alternative meets conservation measures	This alternative meets conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to increase. Distribution should improve over the Grasslands, and should move towards the potential distribution.

Effects on Sagebrush Species (Except Sage grouse)

The expected distribution of sagebrush canopy cover classes at the end of the decade would shift to more acres in the greater than 15 percent canopy cover class with few acres in the 0-5 percent and 6-15 percent canopy cover classes, very similar to Alternative C. This shift in canopy cover would not meet Vegetation Properly Functioning Condition criteria in the short-term or over the long-term. A decrease in available habitat would be expected for species associated with more open stands, such as short-eared owl and long-billed curlew. Species, such as sage grouse and pygmy rabbit that use closed canopy stands, would be favored on the Grassland.

Table 4.40. Alternative D. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	An 11% decrease would be expected in suitable habitat over the Grassland, and a 3% decrease over the GCVA, based on sagebrush overstory. Lack of livestock grazing should increase suitable habitat for voles. Populations of short-eared owls would be expected to decrease over the Grassland and the GCVA.
Long-billed curlew	An 11% decrease would be expected in suitable habitat over the Grassland, and a 3% decrease over the GCVA, based on sagebrush overstory. Lack of livestock grazing and vegetation treatments would result in decreased areas of suitable habitat for nesting. Populations of long-billed curlew would be expected to decrease over the Grassland and the GCVA.
Columbian Sharp-tailed grouse	Approximately 94% of sagebrush acres would remain in the greater than 5% canopy cover. Understory diversity may improve somewhat on some of the sites (native veg, 25% of the area) due to lack of livestock. Overhead nesting cover would be expected to increase nesting success. Populations of sharp-tailed grouse would be expected to increase over current levels on the Grassland and GCVA.
Pygmy rabbit	A 20% increase would be expected in suitable habitat over the Grassland, and a 2% increase over the GCVA, based on sagebrush overstory. Fragmentation would not increase, with the number of sagebrush patches greater than 320 acres in denser stands remaining at 19. Understory diversity may improve somewhat on some of the sites (native veg, 25% of the area) due to absence of livestock. Populations and distribution would be expected to improve over the Grassland and stay the same over the GCVA.

Effects of Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Sagebrush would not be managed in this alternative. Instead, sagebrush would be allowed to succeed toward a late seral stage without the influence of any treatments.

The ten-year projected outcome would shift a substantial number of existing sagebrush acres into the greater than 15 percent canopy cover. Over the long-term, as the majority of acres move into

these denser canopy cover classes of greater than 15 percent, a reduction in understory production and vigor would occur. These stands would meet the overstory requirement but are not likely to meet the percent cover requirement for grasses and forbs. Termination of livestock use will allow most plants to retain their full height and they should meet the height requirement, depending on yearly growing conditions. Treatments that would be proposed to maintain minimum viable populations would need to be designed to insure project outcomes result in habitat improvements.

The desired future condition defined for this alternative would result in the majority of sagebrush acres in a late seral stage with canopy cover greater than 15 percent. Over time, diversity in the understory would decrease as the canopy cover increases. Existing native vegetation sites would eventually reach late seral conditions, where understory vegetation is declining in vigor, production and diversity. Management intervention may be needed at that point in time to meet this guideline.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

See Alternative C discussion.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

No substantial disturbance as a result of management activities would be expected. Vegetation treatments, including prescribed fire, herbicide applications, brush beating, plowing and reseeding would be allowed only to maintain viable wildlife populations.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Sagebrush would not be managed in this alternative. Instead, sagebrush would be allowed to naturally evolve toward a late seral stage without the influence of any treatments or livestock grazing. Sagebrush density and height would continue to increase and potential winter habitat would increase. This alternative meets this guideline.

Overall Compliance with Sage Grouse Guidelines

Alternative D partially meets the sage grouse guidelines. An increase would be expected in the number of sagebrush acres in the greater than 15 percent canopy cover class. Residual vegetation would be more than adequate to provide for sage grouse needs. Over time, understory

diversity would decline, reducing habitat for breeding and nesting birds. The potential for disturbance to breeding and nesting birds would be low.

Miles of Tree Rows at End of Decade

Effects would be the same as those discussed in Alternative A.

Cumulative Effects:

See page 4-197 and 4-202.

Irretrievable/Irreversible Effects:

At the end of the first decade a net loss of 2,254 acres in the 16-24 percent sagebrush canopy cover would be irretrievably lost as acres naturally succeed into the greater than 24 percent canopy cover class, reducing the extent of suitable habitat for nesting sage grouse.

●Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative D proposes 0 acres as suitable for livestock grazing. No utilization levels are proposed. No treatments are proposed unless viability of wildlife populations is at risk**.**

Direct and Indirect Effects:

The most immediate and direct effect of this alternative would be the complete loss of livestock grazing and the existing 21,480 head months currently permitted on the Grassland. No grazing would be permitted in this alternative.

Table 4. 41. Alternative D
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	39.2 M	0	(-)
Year 10	31.2 M	0	(-)

[1] Shown in millions of pounds based on capable acres in this alternative. Includes all vegetation types – sagebrush, mountain brush and riparian.

No treatments are proposed in this alternative unless associated wildlife populations fall below viability thresholds.

Without management treatments or livestock grazing, overall grassland forage production would decline as acres in the higher production canopy cover classes move into the greater than 15 percent canopy cover class. Once all acres were in the greater than 15 percent canopy cover class, production would stabilize at about 500 pounds per acre.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

The existing 21,480 permitted head months would be irretrievably lost as long as the Grassland was managed for greater than 15 percent canopy cover without livestock grazing.

No irreversible effects have been identified for this alternative.

Alternative E

Summary Description of Treatments

Under Alternative E, livestock grazing would be allowed on 46,594 suitable acres. The remaining 1,006 acres would not be suitable for livestock grazing.

Approximately 17,200 acres of sage grouse habitat would be treated using a combination of prescribed fire and herbicide treatments. These treatments would be designed to sustain high levels of grass production for livestock grazing. This alternative would treat 7,500 acres outside of bulbous bluegrass sites that have sagebrush with canopy cover greater than 15 percent using prescribed fire to attain 0-5 percent sagebrush canopy cover over the next ten years. It would treat an additional 7,000 acres outside of bulbous bluegrass sites that have sagebrush with canopy cover greater than 15 percent using herbicides to attain 0-5 percent canopy cover so livestock could continue to graze without removal. The majority of sagebrush acres would be managed for sagebrush canopy cover in less than 5 percent canopy cover to enhance/maintain grass and forbs production for livestock grazing.

Table 4.42 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.42. Alternative E
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome of Treatments	Desired Future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	26% of acres	Greater than 50% of acres
6%-15% canopy cover	24% of acres	23% of acres	Less than 25% of acres
Greater than 15% canopy cover	59% of acres	51% of acres	Less than 25% of acres

Alternative E would treat 200 acres of mountain brush over the next ten years using prescribed fire to achieve early seral structure and composition.

Approximately 2,500 acres of bulbous bluegrass (2200 acres in the greater than 15 percent canopy cover and 300 acres in the less than 15 percent canopy cover) would be treated using prescribed fire, plowing, and herbicide applications. Revegetation would be accomplished with non-native and native species emphasizing forage production. Treated sites would generally tend to be at least 500 acres or larger.

In Alternative E two utilization levels would be established to achieve desired vegetation conditions: a 50-60 percent utilization level would be applied on upland vegetation for both native and non-native species; a riparian utilization level of 50 percent would be established at the riparian greenline.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

●Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative E would treat an average of 1,720 acres a year over the ten-year plan period. Approximately 2,500 acres, where bulbous bluegrass dominates the understory, would be treated over the decade using prescribed fire, plowing, and reseeding with a mix of native and non-native species. About 700 acres per year would be treated using herbicides. An additional 750 acres per year would be treated using prescribed fire. Current bulbous bluegrass treatment practices require no less than five years to recover ground cover to a minimum of 60 percent for soil protection. Prescribed fire treatments normally require two to four years to recover vegetation ground cover to a minimum of 60 percent for soil protection.

Over the ten-year plan period, up to 1,350 acres (3 percent of Grassland watersheds) could be in a disturbed condition each year, once the treatment program reaches the fifth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability could be less than if impacts were concentrated in a single watershed.

Proposed treatments in this alternative specifically identify 2,500 acres of bulbous bluegrass dominated sites where ground cover is currently less than 60 percent. After treatment and reseeding with a blend of native and non-native seeds, ground cover on these sites would be maintained at about 60 percent or greater.

Prescribed fire treatments on 7,500 acres outside of bulbous bluegrass areas would rely on natural regeneration. Vegetation that exists prior to treatment would be expected to regenerate after treatment. Ground cover potential on these sites would remain at 60-80 percent on native and desirable non-native sites and 50-60 percent on bulbous bluegrass dominated sites.
The 7,000 acres proposed for treatment using herbicides, would have negligible effects on watershed stability and condition. Even though overstory canopy cover would be reduced. The herbicide treatment would not affect non-woody species, and the density of the understory component in these areas would not substantially change as a result of the treatment.

Although sagebrush use more water than herbaceous understory vegetation, removing the woody overstory using an herbicide should not affect total water yields. Herbaceous understory vegetation would use any additional available water within their rooting zone. Changes in runoff would be negligible on these sites.

Surface runoff would increase in the burned and plowed areas, which has a direct effect on erosion and sediment. The lack of protective cover during treatment would increase the potential for soil displacement and transport.

Prescribed fire treatments would not substantially alter overall soil productivity; however, most, if not all, vegetative ground cover would be initially lost. Until vegetation is reestablished, surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement. If the treatment area is plowed, similar conditions to fire would occur; however, plowing also can alter the soil profile by mixing soil layers. From plowing, infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff could substantially increase over natural rates on these sites.

Using the Forest Service interfaces for the WEPP Model, predicted erosion rates at the site-specific level can range from near 0 tons per acre to nearly ten tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have erosion rates ranging from 0 tons to about 1.4 tons per acre, depending on the intensity of precipitation following the treatment. Using this field scenario and assuming up to 1,350 acres could be in a disturbed condition beginning in year five of the treatment program proposed in this alternative, erosion rates could range from near 0 tons to as much as 1,890 tons per year. If increased runoff and erosion from treated sites causes primary channels to adjust, overall watershed stability could be reduced.

Livestock grazing would occur at slightly lower utilization rates than Alternative A. In this alternative, utilization would be reduced about 5 percent from current utilization levels. This use level would tend to maintain existing overall ground cover. Microbiotic crusts would continue to be impacted by hoof action, which would tend to degrade this form of soil protection.

Overall, watershed conditions within the Grassland would decline initially as substantial acres are treated and percent ground cover is decreased. As ground cover is reestablished, watershed conditions would improve to near present ratings as discussed in Chapter 3.

Total watershed ratings, including both public and private land, would not be expected to improve over current conditions without improvements in soil conservation, runoff and erosion control efforts watershed-wide.

Cumulative Effects:

See page 4-195

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site is degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer be a viable ground cover source. As long as these conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass areas, potential ground cover is less than other sites that have native or desireable non-native plant species. Watershed condition would be maintained at less than potential in these bulbous bluegrass areas. As long as these non-native species dominate a site, ground cover potential would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which would result in increased runoff and erosion potential.

No management actions are prescribed in this alternative that would cause an irreversible commitment of resources.

Riparian Condition

This alternative proposes to establish Riparian Wetland Areas (RWAs) on the riparian vegetation green line. New livestock facilities would be placed outside RWAs. Riparian livestock utilization levels would be established at 50 percent or a greater than three-inch stubble height at the end of the grazing season on riparian sedge (*Carex*) species, whichever occurs first. No treatments are proposed in riparian areas.

Direct and Indirect Effects

In this alternative, livestock utilization within RWAs would be slightly lower than utilization rates proposed in Alternative A. The miles of streams and acres of riparian/wetland areas accessible to livestock would be the same as Alternative A. As a result, impacts to riparian vegetation would be slightly less in this alternative than those described for Alternative A.

The riparian pasture along South Fork Rock Creek should help reduce the overall sediment loading to this 303(d) water quality limited stream. However, without more limiting criteria specifying vegetation use or allowable stream bank disturbance, sediment loading may not be reduced to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams throughout the Grassland would remain essentially the same as the current situation. The intent of the Clean Water Act and Idaho's antidegradation policy would not be satisfied.

A slight modification in streamside utilization levels in this alternative would help to slightly improve the overall density and vigor of streamside vegetation, as well as help reduce bacteria and nutrient inputs into streams. Any improvements in riparian vegetation would depend on the existing condition of specific stream reaches. Stream channels assessed as properly functioning or functioning-at-risk could experience a small improvement within a few years, if riparian vegetation improves. Because this alternative only measures utilization on the green line, any improvements would be minor. Degraded channels, assessed as functioning-at-risk to nonfunctioning, would require more time to heal. Channels that have been deeply downcut may take decades to recover as evolutionary processes continue. Upstream influences, particularly from agricultural farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence channel stability and vegetation growth. Existing woody

(willow) vegetation density and vigor may begin to improve somewhat, but no substantial improvement should be expected.

Effects of vegetation treatments on water quality and channel stability can range from non-measurable to considerable depending on treatment location and the condition and channel type of the receiving stream. (See Watershed discussion under Alternative E.) In most cases, slopes within the Grassland are generally less than 20 percent, with many less than 4 percent. Runoff increases on these more gentle slopes would be less than the amount potentially produced from steeper slopes. A decrease in potential runoff would have a corresponding decrease in potential sediment. Expected erosion rates from treated areas can range from near 0 on flat slopes with ground cover greater than 60 percent, to as much as seven tons per acre above current rates on 20 percent slopes with no ground cover following a heavy precipitation event (See Table 4.2).

Vegetation treatments that include burning and plowing have the potential to increase runoff and downstream sediments. Sediment loading could cause substantial impacts to downstream water quality, depending on the location of the treatment and the amount of erosion that occurs as a result of the treatment. (See Watershed discussion under Alternative E) Increases in water yields and sediment would occur two to four years following treatment, with the greatest increases occurring during the first year following treatment.

Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases are relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions. No significant water quality problems should occur from the application of herbicides when they are used to reduce sagebrush canopy. No State or Federal water quality standards should be exceeded if properly applied. No threats to human, animal, insect or aquatic biota should result from treatments.

No substantial improvement in overall water quality would be realized over current conditions. If any streams within or directly adjacent to the Grassland were to be determined by the State as not meeting beneficial use standards and listed as a 303(d) stream, grazing standards would probably not be sufficient to improve degraded water quality conditions. Impacts of upland vegetation treatments would have to be evaluated on a site-specific, project-by-project basis.

Impacts from adjacent lands in other ownerships would presumably continue at present rates. These impacts from other land ownership would play a primary role in the success of any improvement of riparian areas and water quality on the Grassland. Minimal improvements in overall water quality would be expected for affected watersheds as a whole.

Approximately twenty-four miles of stream would slightly improve toward properly functioning condition. The rate of recovery would be slightly faster than Alternative A with about 10 percent lower livestock grazing utilization rates proposed in this alternative.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality are irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area would depend on the extent of the degradation and the corrective actions taken.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to pre-disturbance conditions. Through prudent management practices, some of these channels could be stabilized; however, to be fully functional, many of these channels would have to undergo an evolutionary process that could take decades. In these cases, pre-disturbance channel conditions are longer achievable which would be an irreversible and irretrievable commitment of this resource.

●Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

The effects proposed treatments in this alternative would have on sagebrush canopy cover, sagebrush succession, and Vegetation Properly Functioning Condition are discussed below.

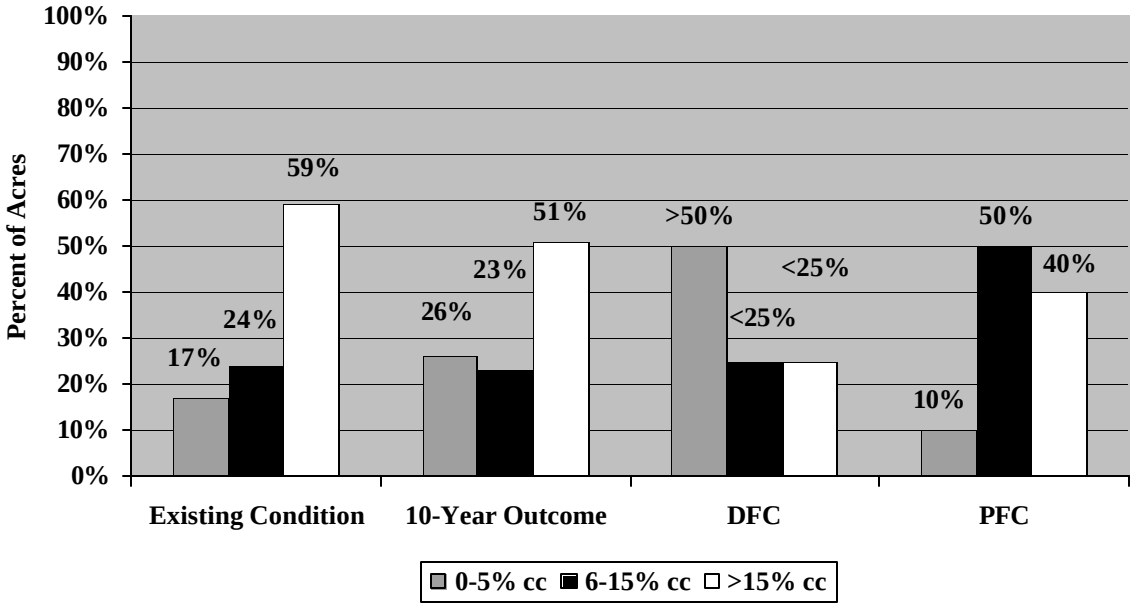
Direct and Indirect Effects:

Curlew National Grassland

Treatments and natural succession in this alternative would increase the number of sagebrush acres in the 0-5 percent canopy cover class by about 9 percent during the ten-year plan period. A decrease of about 1 percent would occur in the number of sagebrush acres in the 6-15 percent canopy cover class. The number of sagebrush acres in the greater than 15 percent canopy cover class would decrease by about 8 percent.

Figure 4.17 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, and the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.17. Alterntaive E
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and the VDDT Model.

The ten-year projected outcome of treatments proposed in this alternative would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require additional treatments on sagebrush acres in the greater than 15 percent canopy cover to increase the number of sagebrush acres in the 0-5 percent canopy cover class. Over the long term (50 to 100 years), succession and treatments in following decades would trend the sagebrush cover type to the less dense, higher forage producing canopy cover classes.

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.43.

Table 4.43. Alternative E. Ten-Year VDDT Model Outcomes On Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	26%
6-15% canopy cover	23%
16-25% canopy cover	19%
>25% canopy cover	32%

The sagebrush cover type on the Grassland would not meet sagebrush PFC criteria during the 10-year plan period. Over the long term, with additional treatments in subsequent decades, sagebrush acres would trend away from the range for PFC structure, composition, and patterns.

Patterns would continue to be influenced by land practices private lands adjacent and within the Grassland boundary.

When disturbances occur, such as lethal fire, an increased risk of undesirable and non-native plant invasion may also occur. Shrubs that sprout after fire, such as threetip sagebrush and rabbitbrush, may increase and even become dominant. Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

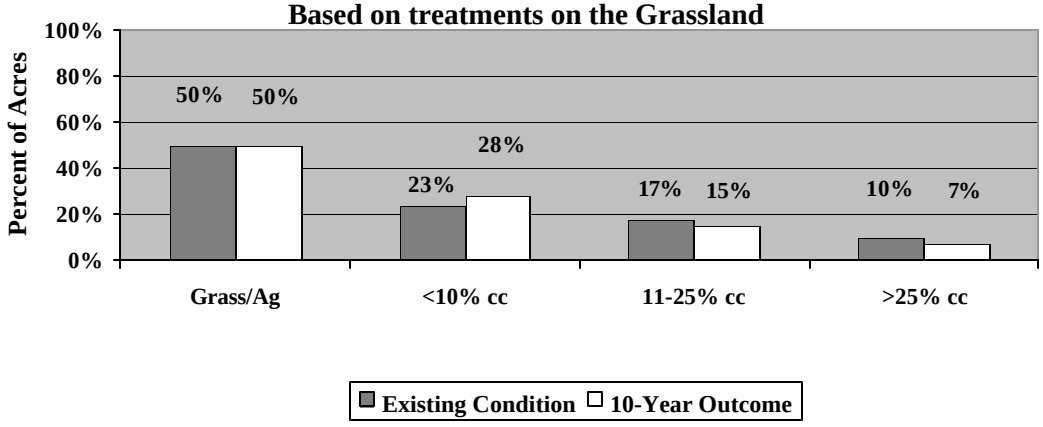
Managing Grassland resources under Alternative E would maintain the sagebrush system at a **high** magnitude of departure from the historic range of variation. This degree of departure would decrease the system's resiliency and ability to recover after disturbance over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 71,100 acres, a reduction of about 19 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside PFC criteria.

Figure 4.18 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.18. Alternative E
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

Over the ten-year plan period, a net decrease of 3,612 acres of sagebrush in the greater than 15 percent canopy cover class is expected. The decrease in this sagebrush canopy cover class would be considered an irretrievable effect until acres moved back into the greater than 15 percent canopy cover through natural succession.

No irreversible effects have been identified in this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative proposes to treat approximately 200 acres of mountain brush using prescribed fire to achieve early age structure and composition on treated acres.

After treatment, approximately 15 percent of the mountain brush acres on the Grassland would be in early age structure and composition. The remaining acres, about 85 percent, would be in mid or late age structure and composition by the end of the ten-year plan period. Treatment size would range from small patches of less than 50 acres to an area of up to 200 acres.

The effects in this alternative would be similar to Alternative B, except this alternative treats 50 additional acres of mountain brush. Treating these additional acres would cause structure, composition, patterns and disturbance regimes of mountain brush to trend more quickly toward PFC than that projected for Alternative B. Limited treatments in mountain brush would create a small change in the diversity of age classes. Treatments would improve the long-term maintenance and sustainability of mountain brush. Resiliency to disturbances, such as fire, would increase.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

No irretrievable or irreversible effects have been identified in this alternative.

Vegetation Understory Composition

Direct and Indirect Effects:

This alternative would emphasize management for livestock production and would convert about one-third (36 percent) of the Grassland into an early seral shrub habitat over the ten-year plan period.

Prescribed fire treatments using natural regeneration on 7,500 acres of sagebrush in the greater than 15 percent canopy cover class, would not change understory composition. Assuming treatments would occur on crested wheatgrass sites, because they are the most productive, it would be expected that crested wheatgrass would naturally regenerate along with other highly competitive non-native species, such as alfalfa, that may still remain on the site. Native grasses and forbs would not be expected to re-establish in the community to any great extent. Removing dense sagebrush canopy cover would stimulate understory production as additional moisture and nutrients become available. Any existing forbs in the understory could be lost as a result of prescribed fire treatments due to the greater competitive nature of crested wheatgrass for the available soil moisture (Harrison, 1996). Without treatment the sagebrush overstory would become denser on crested wheatgrass sites. Moisture and other nutrients would not be available for understory vegetation. As a result, understory vegetation would become sparser.

Prescribed fire treatments on native plant communities would move them into an early seral stage. Immediately after treatment, more annuals could be expected in the understory, followed by forbs and then grasses. Individual cheatgrass plants are scattered along disturbed sites on the Grassland. If cheatgrass is present in the existing vegetation prior to treatment, prescribed fire treatments could actually hasten its invasion into treated areas by removing herbaceous competition. By opening up the overstory, perennial and brush species would appear within a year, depending on germination conditions. Forb species existing on-site at the time of treatment would reappear after treatment in greater densities and vigor with grasses germinating soon after. Over time, herbaceous species would gradually become sparser as the canopy cover increases over a twenty- to forty- year cycle. Vegetation production would be weighted more heavily to the herbaceous layer until shrubs reestablish.

Prescribed fire treatments on mountain brush would move about 15 percent of the acres to an early seral stage, leaving the remaining acres in the older seral stage. No mid-seral stage would be present. Because most of these acres occur on native range, the diversity of the shrub and herbaceous layer offers a variety of habitats for wildlife. It is expected that treated mountain brush acres would respond similarly to sagebrush in native plant communities after treatment. By opening up the overstory, more annuals could be expected in the understory immediately after treatment. Individual cheatgrass plants are scattered along disturbed sites on the Grassland. If cheatgrass is present in the existing vegetation prior to treatment, prescribed fire treatments could actually hasten its invasion into treated areas by removing herbaceous competition.

Perennial species would appear within a year, depending on growing and germination conditions, followed by forbs and then grasses. Forb species existing on-site at the time of treatment would reappear after treatment in greater densities and vigor with grasses germinating soon after. Over

time, herbaceous species would gradually become sparser as the canopy cover increases over a twenty- to forty-year cycle. Vegetation production would be weighted more heavily to the herbaceous layer until shrubs reestablish.

Heavy herbicide applications on 7,000 acres of sagebrush would eliminate the sagebrush and favor understory production. Understory composition diversity would increase slightly, depending on the remaining sagebrush density. After treatment, forage production would be expected to increase over two or three years.

Bulbous bluegrass treatments would enhance the production and diversity of approximately 2,500 acres currently dominated by this species. In this alternative a seed mix of native and desired non-native grass and forbs would be used for restoration on these sites. Production would increase over current levels once bulbous bluegrass is eliminated on these sites, if the seed mix contains predominantly grasses with a minor forbs component. It is not likely sagebrush would be included in the seed mix in this alternative. Understory diversity would be enhanced with the introduction of native forbs in the seed mix.

This alternative proposes a 50 percent use level or three-inch stubble height in the riparian zone and a 50-60 percent use level on all plants.

On the non-native forage species, the proposed livestock use level would be close to an optimum and would be expected to sustain vigor and production in the seedings.

On native sites, a 50 percent livestock use level would be too heavy toward the upper end of 60 percent to sustain native plant communities if they were grazed at the same time every year. Rasmussen's review of literature on use suggests that as long as water is available and meristematic tissue is available for growth, plants will not be permanently damaged by this level of use. He also suggests that this level of use should not occur every year at the same time. If it occurs late in the season, after the plant has gone to seed, little effect would be expected.

This level of livestock use would not be expected to change composition or production, because this is the level of use that has been sustained for many years. Pastures are annually rotated in terms of the time of year they are used. Because native land is fenced into fields that have been seeded, they are usually used at a substantially lower level than the seedings. Seedings are generally found on more accessible topography and are generally closer to water. Early in the season more growth is available and more palatable to grazing livestock. This level of grazing would be expected to maintain stable native communities with a stable or slight upward trend.

In riparian areas, a 50 percent livestock use level would be an improvement over existing conditions and an upward trend in plant vigor and composition could be expected. Overall aquatic habitat conditions would be expected to increase and riparian processes would be restored over time.

This alternative has the potential to improve understory diversity on 2,500 acres of bulbous bluegrass. All 2,500 acres would be reseeded with a mix of native and desired non-native seeds. Understory diversity would improve on prescribed fire treatments in native vegetation. A

substantial increase in herbaceous production would result from all treatments proposed in this alternative.

Approximately 2,000 acres of bulbous bluegrass would remain untreated at the end of the ten-year plan period. The understory on these acres would not change in diversity and forage production for livestock or to meet wildlife needs would remain low.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of understory diversity and forage production on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with them could be causing an irretrievable loss yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation reestablishes.

Wildlife Habitat Management

Direct and Indirect Effects:

Effects on Sagebrush Habitat

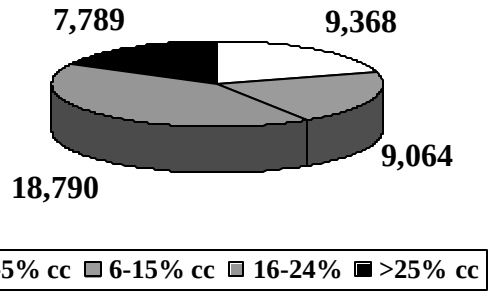
Alternative E proposes a .25-mile buffer around active sage grouse leks in habitats considered suitable for sage grouse nesting and brood-rearing, except where bulbous bluegrass in sagebrush understories dominate the site and are prioritized for treatment. Although vegetation treatments would be permitted within the buffer zone, it is assumed treatments would occur outside buffer zones first. Vegetation treatments in relationship to lek locations would be analyzed at the site-specific level prior to treatment.

Table 4.44. Alternative E. Changes in Percentage of Acres in Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	26%	50%	50%
6-15% cc	24%	23%	23%	28%
16-24% cc	42%	19%	17%	15%
>25%	17%	32%	10%	7%

Figure 4.19 displays the existing distribution of sagebrush canopy cover classes outside the .25-mile buffer of known lek locations.

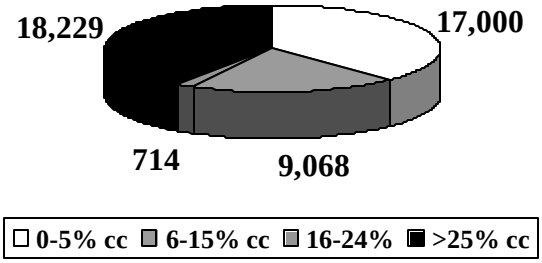
Figure 4.19. Alternative E
Existing Acres of Sagebrush Canopy Cover
Outside .25-Mile Buffer
Year 0



Buffer zones in this alternative encompass about 5 percent of the Grassland acres. No treatment would occur within these buffer zones. About 95 percent of the Grassland would be available for treatment outside of the buffer zones. Treatments could be distributed across the landscape and would treat approximately 39 percent of the acres with canopy cover greater than 15 percent outside the buffer zones. Herbicide treatments would not remove the understory, but herbicide applications would reduce canopy cover to the 0-5 percent canopy cover class. It is expected that all of the sagebrush acres in greater than 25 percent canopy cover would be treated using prescribed fire or herbicide applications.

Figure 4.20 displays an estimation of the results of treatments on canopy cover classes in Year 10 on the acres outside of buffer zones. Figure 4.20 does not necessarily represent true on-the-ground conditions in Year 10. It is used as a tool to show differences between alternatives only.

Figure 4.20. Alternative E
Estimated Acres of Sagebrush Canopy Cover
Outside .25-Mile Buffer
Year 10



Treatments could reduce the number of patches greater than 320 acres of sagebrush in greater than 15 percent canopy cover from nineteen to zero. Implementation of this alternative, with a .25-mile buffer, would result in a dispersal of treatments across the Grassland, rather than concentrated in a few areas. Fragmentation of sagebrush patches would be dispersed. Connectivity outside of the buffer would decrease as treatments convert habitat patches to 0-5 percent canopy cover.

Effects on Riparian Species

Effects on riparian species would be similar to Alternative A. This alternative proposes to manage riparian areas at the green line - vegetation directly adjacent to the stream channel - as a special emphasis zone for riparian and stream channel processes. Livestock riparian utilization would be established at 50 percent (dry weight) or a greater than three-inch stubble height at the end of the grazing season on riparian sedge (*Carex*) species. This alternative would result in a narrow riparian area that would reduce the potential for riparian habitat beyond the streamside vegetation. Species other than sedges would be more important components in the understory for sage and sharp-tailed grouse broods and other riparian-related wildlife. Sage and sharp-tailed grouse use riparian areas for late spring, early summer brooding habitat, because of succulent vegetation and insects that are available. Suitability for this use is very limited under this alternative. A residual three-inch stubble height would not provide the quality or quantity of security cover for broods in late summer that Alternatives B, C, D, F, G and H would provide.

Improvements in vegetation conditions would not be expected. No increase in willow riparian habitat would be expected in the next ten years. Habitat for riparian-associated species-at-risk and management indicator species would be maintained at current low levels over the ten-year plan period.

Table 4.45. Alternative E. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would be maintained at current low levels.
How well the alternative meets conservation measures	This alternative does not meet conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to remain at low levels and be poorly distributed across the Grasslands, due to the isolated areas of currently suitable habitat.

Effects on Sagebrush Species (except Sage grouse)

The distribution of canopy cover classes at the end of the decade would be expected to shift more acres to the more open canopy cover classes of 0-5 percent and 6-15 percent with fewer acres in the denser canopy cover classes. This shift will not meet Vegetation PFC criteria for the sagebrush type although a more distributed pattern of canopy cover classes would be expected. As a result, an increase in habitat is expected for species using more open stands, such as the short-eared owl and long-billed curlew. Available habitat would decrease for species associated with denser canopy stands, such as the sage grouse and pygmy rabbit.

Sagebrush associated species generally nest on the ground under shrubs, or in taller sagebrush plants. The removal of sagebrush could reduce production of these species on treated sites.

Upland livestock utilization levels would be established at 50 to 60 percent for both native and non-native vegetation. The effects of utilization rates proposed in this alternative would be a slight improvement over Alternative A. Residual vegetation at this utilization rate would not provide sufficient cover for most ground-nesting birds.

Table 4.46. Alternative E. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	A 9% increase would be expected in suitable habitat over the Grassland, and a 5% increase over the GCVA, based on sagebrush overstory. However, a 50-60% utilization level is predicted to be inadequate to maintain cover for voles. Populations of short-eared owls would be expected to remain at current levels or slightly increase over the Grassland and GCVA.
Long-billed curlew	A 9% increase would be expected in suitable habitat over the Grassland, and a 5% increase over the GCVA, based on sagebrush overstory. Utilization levels of 50-60% and vegetation treatments would result in increased areas of suitable habitat for nesting. Populations of long-billed curlew would be expected to increase above current levels over the Grassland and GCVA.
Columbian Sharp-tailed grouse	Approximately 74% of sagebrush acres would remain in greater than 5% canopy cover. Burn treatments would regenerate naturally, but bulbous bluegrass treatments would use a mix of native and non-native seed, with an estimated increase of 1,250 acres of crested wheatgrass. Utilization levels of 50-60% will maintain current low levels of overhead nesting cover and would be expected to maintain nesting success. Mountain brush treatments would reduce potential winter habitat on the Grassland by treating 15 percent of existing mountain brush acres. Populations of sharp-tailed grouse would be expected to remain at current levels.
Pygmy rabbit	An 8% decrease would be expected in suitable habitat over the Grassland, and a 3% decrease over the GCVA, based on sagebrush overstory. Fragmentation would increase, with a drop from 19 to 0 in the number of sagebrush patches greater than 320 acres in denser stands. Burn treatments would regenerate naturally, but bulbous bluegrass treatments would use a mix of native and non-native seed, with an estimated increase of 1,250 acres of crested wheatgrass. Populations and distribution would be expected to decrease from the current levels.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative avoid vegetation treatments within a .25-mile buffer around active sage grouse leks in habitats considered suitable for sage grouse nesting and brood rearing.

Over the ten-year plan period, sagebrush would be managed to provide less than 25 percent of the acres in greater than 15 percent canopy cover. Treatments would reduce available nesting and brooding habitat similar to Alternative A. Outside the .25-mile buffer, canopy cover would not meet the guideline on over 25 percent of the area. A reduction in nesting habitat may result in decreased numbers of successfully nesting sage grouse. The degree of impact would depend on the size, timing, and location of treatments relative to other disturbances. If treatment areas are located in close proximity to each other or are conducted in relatively short time intervals, the impact on sage grouse and other sagebrush-associated species would increase. Sharp-tailed grouse are not as dependent on sagebrush but still rely on some shrub cover to provide nest protection (D. Meints, pers. comm).

Bulbous bluegrass treatment on 2,500 acres would result in a loss of understory and canopy cover for a minimum of five years. Reseeding with a blend of native and non-native seeds should result in an improvement in understory diversity for the first few years after treatment. As sagebrush begins to reestablish on treated sites over time (twenty-five to thirty years), understory diversity would decline in vigor, production and diversity.

Upland livestock utilization rates would be established at 50 to 60 percent for both native and non-native vegetation. Utilization levels in this alternative would remove vegetation below the preferred level for nesting cover. The limited amount of residual cover would maintain current levels of nesting success.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

The travel plan proposals are the same as Alternatives A and B. Unlimited off-road travel during breeding season has the potential to disturb displaying and nesting grouse and does not meet this guideline.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative E for a discussion on potential erosion rates based on treatments in each alternative. The Vegetation Understory section under Alternative E discusses changes in understory composition and structure in relationship to proposed treatments in this alternative).

Prescribed fire treatments in this alternative could result in reduced soil moisture effectiveness and increased erosion until vegetation reestablishes. Natural regeneration would be used to revegetate treated sites. On native vegetation sites, treatments could increase understory forbs production until sagebrush reestablishes on the site and begins to out-compete grasses and forbs

for water and nutrients. On non-native sites, existing understory vegetation would be expected to reestablish after treatment.

Treatments using herbicides do not disturb the ground. No increase in erosion is expected on these acres. Canopy cover reduction should expose understory species to more sunlight, water and nutrients. An initial pulse in understory growth would be expected. As sagebrush canopy slowly closes over time, understory diversity would be expected to decline.

On treated bulbous bluegrass sites reseeded with a blend of native and non-native seeds, some improvement in understory diversity would be expected. All of these treatments convert sagebrush canopy in greater than 15 percent to the 0-5 percent class. While understory diversity is improved, suitability for use by sage grouse is expected to be limited over the short-term. As sagebrush moves into the 6-15 percent canopy cover class (tent to twenty years), areas may be used for brood-rearing.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Treatments in this alternative would result in more acres in the less dense canopy cover classes. A reduction of available sage grouse winter habitat would be expected. With fewer acres in the greater than 15 percent canopy cover class, winter survival of sage grouse and other sagebrush obligates may decline.

Overall Compliance with Sage Grouse Guidelines

Alternative E would not meet the guidelines. The majority of treatments would result in a reduction in the number of sagebrush acres in the greater than 15 percent canopy cover class. Utilization levels proposed in this alternative would not provide sufficient residual vegetation for breeding and nesting birds. The potential for disturbance to breeding and nesting birds would be high.

Miles of Tree Rows at End of Decade

The effects would be the same as those discussed in Alternative A.

Cumulative Effects:

See page 4-197 and 4-203.

Irretrievable/Irreversible Effects:

Managing riparian zones at the green line would result in an irretrievable loss of potential habitat for sage and sharp-tailed grouse and nesting and summer range for neotropical migrants outside of the riparian green line.

The loss of 16,700 acres of sagebrush in greater than 15 percent canopy cover would be an irretrievable loss of nesting habitat for sage grouse until sagebrush reestablishes to the point it meets habitat requirements.

The loss of native understory for ground nesting and ground foraging birds during treatment periods would be an irretrievable loss until vegetation reestablishes and meets habitat requirements. The loss of understory for sharp-tailed grouse nesting would be an irretrievable loss for a minimum of at least one year after prescribed fire treatment.

●Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39

Livestock Grazing

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative E proposes 46,594 acres as suitable for livestock grazing. Based on these acres, the 50-60 percent utilization level and treatments proposed in this alternative, calculations for estimated forage production and potential head months were calculated for the existing situation (Year 0) and Year 10.

Direct/Indirect Effects:

Treatments in this alternative focus on bulbous bluegrass and crested wheatgrass sites with low production to improve forage production for livestock grazing by reducing sagebrush canopy cover and increasing desired grasses and forbs.

Calculations for estimated forage production indicate head months would range from 18,000 to 25,600 compared to the 21,400 head months currently permitted.

Table 4. 47. Alternative E
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	38.4 M	18,000-25,600	(+) or (-)
Year 10	42.3 M	19,200-27,900	(+) or (-)

[1] Shown in millions of pounds and includes all vegetation types – sagebrush, mountain brush and riparian.

Over the ten-year plan period, forage production would increase from about 38.4 million pounds to about 42.3 million pounds. More acres would be maintained in the higher producing 0-5 percent and 6-15 percent canopy cover classes at the end of the ten-year plan period. As production increases, an increase in potential head months from would occur. At the end of the ten-year plan period, livestock grazing could be sustained at higher head month levels if compatible with other resource objectives at that time.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if treatments were to continue, forage production would increase as sagebrush canopy covers were achieved. More acres would be in the higher production canopy cover classes, generally 0-5 percent and 6-15 percent, with fewer acres in the greater than 15 percent canopy cover. Any additional forage production would be available to meet resource management objectives at that time.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Utilization levels and treatments proposed in this alternative would result in an irretrievable loss of grazing head month which would continue until forage production reached levels to recover lost head months during the ten-year plan period.

An average of 2,000 acres would be unavailable for livestock grazing during treatment periods over the ten-year plan period. The loss of head months as a result of treatments would be considered an irretrievable loss during the treatment period or until livestock grazing resumes.

Herbicide treatments on the proposed 7,000 acres would not affect grazing. Grazing would continue while the acres are being treated. No irretrievable loss would occur on these areas.

No irreversible effects have been identified for this alternative.

Alternative F

Summary Description of Treatments

In Alternative F, livestock grazing would be permitted on 46,594 suitable acres. The remaining 1,006 acres would not be suitable for livestock grazing.

Alternative F would treat 12,100 acres of sagebrush and 200 acres of mountain brush over the next ten years. Approximately 9,600 acres outside of bulbous bluegrass sites that have canopy cover greater than 15 percent would be treated using herbicides only to attain 6-15 percent canopy cover. The majority of sagebrush would be managed for 6-15 percent and greater than 15 percent canopy cover.

Table 4.48 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.48. Alternative F
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome of Treatments Percent of Sagebrush Acres	Desired future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	9% of acres	10% of acres
6%-15% canopy cover	24% of acres	31% of acres	50% of acres
Greater than 15% canopy cover	59% of acres	60% of acres	40% of acres

Approximately 200 acres of mountain brush would be treated in this alternative using prescribed fire as the primary management tool to achieve a mix of age and structural classes.

This alternative would treat 2,500 acres of bulbous bluegrass in the sagebrush understory (2,200 acres in the greater than 15 percent sagebrush canopy cover and 300 acres in the less than 15 percent sagebrush canopy cover.) Treatments would include prescribed fire and deep-disc plowing. Revegetation would use a native only seed mix of grasses, forbs and shrubs. Treated sites would generally tend to be at least 500 acres or larger.

Alternative F would establish two utilization levels to achieve desired vegetation conditions: upland forage utilization levels would be established at 40-50 percent for both native and non-native vegetation; riparian utilization would be established at 20-50 percent based on the properly functioning condition of the stream. Lower utilization rates would be used where streams are not functioning or functioning at risk.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found

in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

● Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative F would treat up to 1,230 acres each year during the ten-year plan period. About 960 acres a year would be treated using herbicides. Approximately 200 acres of mountain brush would be treated with prescribed fire each year. About 2,500 acres of bulbous bluegrass dominated sites would be treated over the ten-year plan period. Current bulbous bluegrass treatment procedures require no less than five years to recover ground cover to a minimum of 60 percent for soil protection. Prescribed fire treatments normally require two to four years to recover vegetation ground cover to a minimum of 60 percent for soil protection.

Over the ten-year plan period, up to 1,350 acres[4] (about 3 percent of Grassland watersheds) could be in a disturbed condition at one time, once the treatment program reaches the fifth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability could be less than if impacts were concentrated in a single watershed.

Proposed treatments in this alternative specifically identify 2,500 acres of bulbous bluegrass dominated sites where ground cover is currently less than 60 percent. After treatment and reseeding with a native only seed mix, ground cover on these sites would be improved to 60 percent or greater.

Prescribed fire treatments on 200 acres of native mountain brush, outside of bulbous bluegrass areas, would rely on natural regeneration. Vegetation that exists prior to treatment would be expected to regenerate after treatment. Long-term ground cover potential on these sites would remain at 60-80 percent on these native sites.

The 9,600 acres proposed for treatment using Tebuthiuron, an herbicide, would have negligible effects on watershed stability and condition. Herbicide treatments do not affect non-woody vegetation. Even though overstory canopy cover would be reduced, the density of the understory component in these areas would not substantially change as a result of the treatment.

Although sagebrush use more water than herbaceous understory vegetation, removing the woody overstory using herbicide should not affect total water yields. Herbaceous understory vegetation would use any additional available water within their rooting zone. Changes in runoff would be negligible on these sites.

[4] Only those acres burned or plowed are considered hydrologially disturbed. Areas treated with herbicides are not considered hydrologically disturbed.

Surface runoff would increase on areas treated by plowing, burning or a combination of the two, which has a direct effect on erosion and sediment. The lack of protective cover during treatment would increase the potential for soil displacement and transport from these treated sites.

Prescribed fire treatments would not substantially alter the productivity of the soil. Following treatment, most, if not all, vegetative ground cover would be initially lost. Until vegetation is reestablished, surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement. If the treatment area is plowed, similar conditions to fire would occur; however, plowing can alter the soil profile by mixing soil layers. From plowing, soil infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff would increase over natural rates on these sites.

Using the Forest Service WEPP Model, predicted increased erosion rates at the site-specific level can range from near 0 tons per acre to nearly 10 tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have increased erosion rates ranging from 0 tons to about 1.4 tons per acre, depending on the intensity of precipitation following the treatment. Using this field scenario and assuming up to 1,350 acres could be in a disturbed condition beginning in year five of the treatment program proposed in this alternative, an increase in erosion rates could range from near 0 tons to as much as 1,890 tons per year. If increased runoff and erosion from treated sites cause primary channels to adjust, overall watershed conditions could be reduced

Livestock grazing would occur at lower utilization rates than Alternative A. In this alternative, utilization would be reduced about 10-20 percent from current utilization levels. This use level would tend to maintain or slightly improve overall ground cover potential. Microbiotic crusts would continue to be impacted by hoof action, which would tend to degrade this form of soil protection.

Restricting vehicle use to designated routes would reduce impacts from "road pioneering." Pioneered roads can cause deteriorated watershed conditions, especially on steeper slopes, where runoff water can concentrate in wheel tracks and ruts and create rills and gullies. Keeping vehicles on maintained roads and trails would reduce overall erosion potentials and maintain watersheds in an overall healthier condition.

Watershed conditions within the Grassland would decline somewhat during vegetation treatments, but should improve over the long-term as non-native sites are converted to native sites that provide greater ground cover potential.

Overall watershed conditions, which includes all lands, both private and public, would not be expected to substantially improve without soil conservation, runoff and erosion control efforts watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site is degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer be a viable ground cover source. As long as these conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass area, potential ground cover is less than the sites that have native or desirable non-native plant species. Watershed condition would be maintained at less than potential in these areas. As long as non-native species, such as bulbous bluegrass, dominate a site, ground cover potential of more desirable plant species would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which results in increased runoff and erosion potential.

No management actions proposed in this alternative would result in any irreversible effects to watersheds.

Riparian Condition

Alternative F proposes a 150-foot Riparian Wetland Area (RWA) as a special emphasis zone. New livestock facilities would be placed outside RWAs. Riparian vegetation utilization levels by livestock would be established at 20-50 percent or a two- to six-inch stubble height, based on season of use, stream channel type, and current versus desired riparian conditions. Specific bank disturbance criteria would also be implemented. No treatments are proposed in riparian areas.

Direct and Indirect Effects:

In this alternative, riparian livestock utilization levels are the same as those proposed in Alternative C. Based on the type of existing stream channel and the overall existing condition of riparian vegetation, a range of livestock vegetation utilization levels between 20-50 percent or two- to six-inch stubble height in RWAs would be used to maintain the integrity of riparian areas currently in good condition and improve those areas that are in degraded condition. Bank disturbance criteria would also be implemented. A reduction in total impacts from livestock grazing would be expected, and the potential for improving degraded stream channels and riparian areas would be greater in this alternative than in Alternatives A, B and E. Improving riparian condition trend on 10 percent of the non-functioning or functioning-at-risk streams in this alternative should improve conditions on those sites.

The riparian pasture along South Fork Rock Creek should help reduce sediment loading of this 303(d) water quality listed stream. Specific guidelines for allowable streambank disturbance and lower livestock utilization rates in this alternative may reduce sediment loading to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams throughout the Grassland would improve as grazing impacts to riparian areas and

stream channels are reduced. Allowable uses and disturbances become more restrictive as inherent channel resiliency and channel/riparian functioning condition decrease. This alternative meets the intent of the Clean Water Act and Idaho's antidegradation policy.

Comprehensive riparian standards and guidelines in this alternative should result in improvements in the density and vigor of riparian vegetation, followed by improvements to overall channel condition. Streams that have been assessed as properly functioning or functioning-at-risk would improve first. More degraded channels, i.e., those assessed as functioning-at-risk to nonfunctioning, would require more time to heal. Improving riparian condition on 10 percent of the non-functioning or functioning-at-risk streams by establishing deep-rooted sedges and willows would enhance riparian vegetation along those reaches. Channels that have been deeply downcut may take decades to recover as evolutionary processes re-form the channel. Upstream influences, particularly from agricultural farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence channel stability and riparian vegetation growth.

Vegetation treatments that include plowing have the potential to increase runoff and downstream sediments. Sediment loading from upland vegetation treatments could cause substantial impacts to downstream water quality, depending on the location of the treatment and the actual amount of erosion that occurs as a result of the treatment. (See Watershed discussion under Alternative F). Increases in water yields and sediment would occur two to five years after burning or plowing, with the greatest increases occurring during the first year following treatment. With the modification of streamside impacts, overall reductions in sediment, nutrients and bacteria delivered to area streams should be realized.

Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases are relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions. No significant water quality problems should occur from the application of herbicides when they are used to reduce sagebrush canopy. No State or Federal standards should be exceeded if chemicals are applied correctly. No threats to human, animal, insect or aquatic biota should result from herbicide treatments.

Long-term improvements in overall water quality within the Grassland would be realized over current conditions. If any streams within or directly adjacent to the Grassland are listed by the State in the future as not meeting beneficial use standards and listed as a 303(d) stream, grazing standards should be sufficient to improve degraded water quality conditions to a level that would meet state TMDL requirements. Impacts to water quality from upland vegetation treatments would need to be evaluated on a site-specific, project-by-project basis.

Impacts from adjacent lands in other ownerships would presumably continue at present rates. These impacts from other land ownership play a primary role in the success of any improvement on the Grassland. Unless conservation practices from these other lands are improved, marginal improvements in overall water quality would be expected for the watersheds.

Approximately twenty-four miles of streams would improve. The rate of recovery would be faster than Alternative A, B or E with specific vegetation use and bank disturbance criteria, and three miles of streamside improvement projects in this alternative.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality are irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area is dependent on the extent of the degradation and the corrective actions taken.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many channels have been degraded to the point that it would be impractical to restore them to pre-disturbance conditions. Through prudent management practices, some of these channels could be stabilized; however, to be fully functional, these channels will have to undergo an evolutionary process that could take decades. In these cases, pre-disturbance conditions are no longer achievable which is an irreversible and irretrievable commitment of this resource.

● Vegetation/Wildlife Habitat Management

The effects of proposed treatments in this alternative on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

Sagebrush Canopy Cover

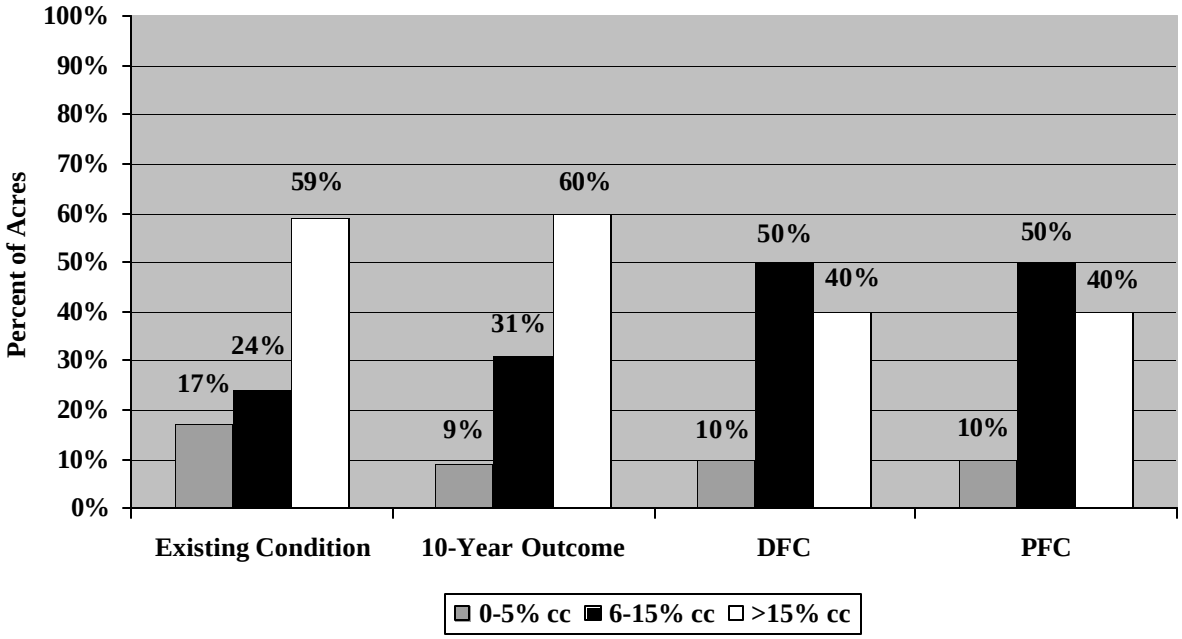
Direct and Indirect Effects:

Curlew National Grassland

Treatments and natural succession in this alternative would reduce the number of sagebrush acres in the 0-5 percent canopy cover class by about 8 percent during the ten-year plan period. An increase of about 7 percent would occur in the number of sagebrush acres in the 6-15 percent canopy cover class. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by about 1 percent.

Figure 4.21 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.21. Alternative F
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and VDDT Model.

The ten-year projected outcome of natural succession and treatments proposed in this alternative would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require additional treatments on sagebrush acres in the greater than 15 percent canopy cover to increase the number of sagebrush acres in the 6-15 percent canopy cover class. Additional treatments in the 0-5 percent canopy cover would be needed to maintain acres in the canopy cover class. Over the long term (50 to 100 years), succession and treatments in future decades would trend the sagebrush cover type toward PFC.

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.49.

Table 4.49. Alternative F. Ten-Year VDDT Model Outcome on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	9%
6-15% canopy cover	31%
16-25% canopy cover	24%
>25% canopy cover	36%

The sagebrush cover type on the Grassland would not meet sagebrush PFC criteria during the ten-year plan period. Over the long term, with additional treatments in subsequent decades, sagebrush acres would trend toward the range for PFC structure, composition, and patterns. Patterns would continue to be influenced by private land practices adjacent and within the Grassland boundary.

When disturbances occur, such as lethal fire, an increased risk of undesirable and non-native plant invasion may also occur. Shrubs that sprout after fire, such as threetip sagebrush and rabbitbrush, may increase and even become dominant. Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

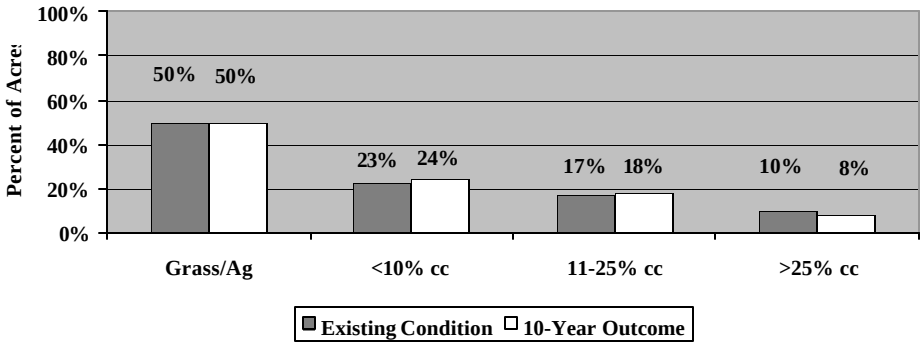
Managing Grassland resources under Alternative F would maintain the sagebrush system at a **low** magnitude of departure from the historic range of variation. This degree of departure would increase the system's resiliency and ability to recover after disturbance over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 76,000 acres, a reduction of about 15 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria.

Figure 4.22 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.22. Alternative F
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irreversible or irreversible effects have been identified in this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative identifies approximately 200 acres of mountain brush to be treated to attain early age structure and composition on these acres. The effects would be similar to Alternative E.

Vegetation Understory Composition

Direct and Indirect Effects:

No prescribed fire treatments would be conducted on sagebrush acres outside of bulbous bluegrass sites. Understory vegetation would become sparser and less vigorous as sagebrush canopy cover increases. No improvement would be expected on these sites in this alternative.

Cheatgrass or other species capable of rapidly invading a disturbed site would not be disturbed in this alternative.

Treating 200 acres of mountain brush with prescribed fires would restore an early seral component to this limited community. Treatments would increase the biodiversity of understory vegetation and improve mountain brush structure by removing dead and mature plants stimulating new growth.

Herbicide applications, such as Tebuthiron, would occur on 9,600 acres to thin sagebrush acres in greater than 15 percent canopy cover to achieve a 6-15 percent canopy cover. An increase in understory forage production would be expected in the second year following treatment. If herbicide treatments are applied on crested wheatgrass sites, understory forage production would increase on these sites as more moisture and nutrients become available. Species diversity in the understory would remain unchanged overall.

Herbicide applications on native vegetation would reduce the canopy cover somewhat by killing some of the sagebrush, allowing more moisture and nutrients to reach the existing understory vegetation. Grasses and forbs existing on the site would be expected to increase in vigor and density after treatment.

Prescribed burning, plowing and reseeding bulbous bluegrass sites with native species would improve understory diversity and increase herbaceous production. If bulbous bluegrass treatment areas are adjacent to other untreated areas where the canopy cover is denser and the understory is primarily composed of non-native species, grazing overuse on restored bulbous bluegrass sites is likely to occur. As the diversity and palatability of understory species increase, grazing animals would select these sites, because they offer diversity not generally available to them. As a result, grazing animals would graze these sites heavily before returning to other less palatable vegetation (Heitschmidt and Walker). Selective grazing is a major factor affecting rate, direction and magnitude of ecological succession, because the competitive abilities of individual plants are altered by frequency and severity of defoliation. If these sites are overgrazed, an invasion of annuals and other non-desirable plants could be expected. Where small, treated areas are adjacent to or intermingled with untreated bulbous bluegrass sites or crested wheatgrass sites, invasion by these species would occur as the native plants become stressed and lose vigor.

This alternative proposes a 20-50 percent livestock use level or two- to six-inch stubble height in riparian zones, and a 40-50 percent livestock use rate on native and non-native plants.

On seeded sites, the proposed livestock utilization level would be considered a low level of use. On bulbous bluegrass, vigor would improve and become more aggressive in its reproductive capabilities. Production could increase and the plant could become more competitive, actually slowing down any increase in density of the shrub layer. Crested wheatgrass would be expected to become wolfy, especially at the 40 percent level of use. Production would drop, fuels would increase, and shrub invasion could be enhanced as vigor dropped. Increasing wolf plants would make plants less palatable, causing more use on previously grazed plants and native plants in the field. Eventually, a decrease in the capacity lower than current estimate would likely occur.

This level of use on natives would be desirable for a sustainable community. An upward trend with more desirable species would be expected. Production could slightly increase, but vigor and reproductive capacity would be expected to increase substantially, allowing the plant community to become more competitive against shrub establishment. More litter and residual cover would be available to improve watershed conditions and provide wildlife cover.

In riparian areas, the effects at this level of livestock use would be expected to be the same as those described in Alternative C.

This alternative provides an opportunity to improve understory diversity and production on 2,500 acres of existing bulbous bluegrass sites. In addition, mountain brush treatments would improve understory diversity on about 200 acres. Some increase in understory diversity and production could be expected on sagebrush acres treated with an herbicide, but not to the same extent as treatments on bulbous bluegrass sites.

Approximately 2,000 acres of bulbous bluegrass would remain untreated at the end of the ten-year plan period. These sites would continue to display a lack of diversity in the understory. Vegetation production would remain at less than 500 pounds per acre.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of understory diversity and forage production on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with it could be causing an irretrievable loss yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation re-establishes.

Wildlife Habitat Management

Direct and Indirect Effects:

Effects on Sagebrush Habitat

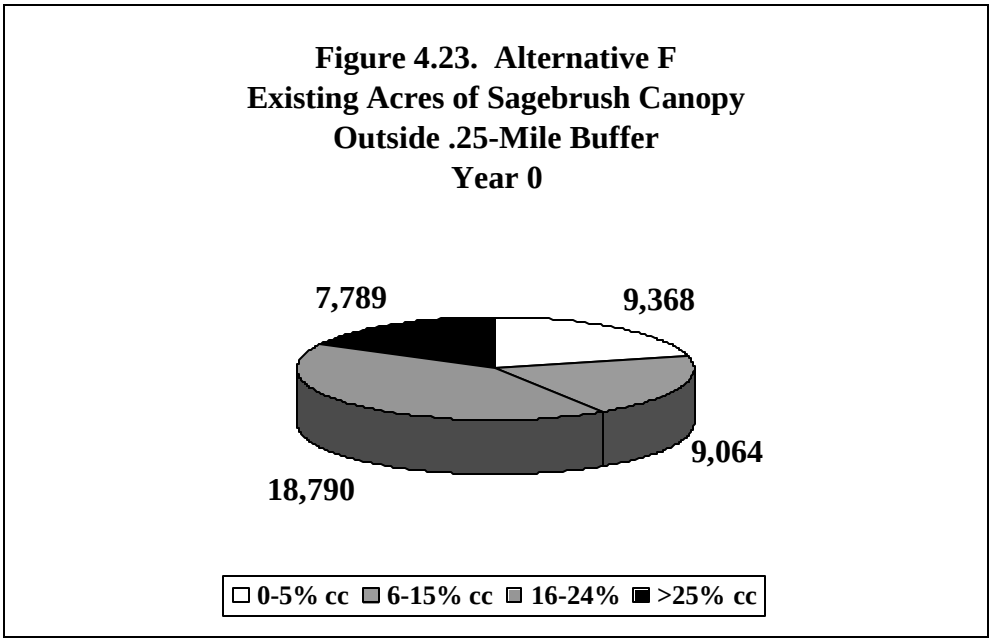
Alternative F proposes a .25-mile buffer around active sage grouse leks in habitats considered suitable for sage grouse nesting and brood-rearing, except where bulbous bluegrass in sagebrush understories dominate the site and are prioritized for treatment. Although vegetation treatments

could occur within the .25-mile buffer, it is assumed that treatments would be completed outside of buffer zones first. Vegetation treatments in relationship to active lek locations would be analyzed at the site-specific project level prior to treatment.

Table 4.50. Alternative F. Changes in Percentage of Acres in Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	9%	50%	50%
6-15% cc	24%	31%	23%	24%
16-24% cc	42%	24%	17%	18%
>25%	17%	36%	10%	8%

Figure 4.23 displays the existing distribution of sagebrush canopy cover classes outside the .25-mile buffer of known active lek locations using 1991 data.

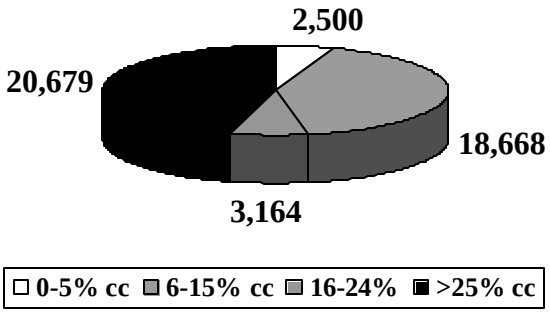


Buffer zones in this alternative encompass about 5 percent of the Grassland acres. About 95 percent of the Grassland would be available for treatment outside of the buffer zones. Treatments could be distributed across the landscape rather than concentrated in a few areas. Approximately 46 percent of sagebrush acres with canopy cover greater than 15 percent would be treated outside the buffer zones. Effects on fragmentation and connectivity would be variable depending on the location or timing of the treatments. Treatments proposed could reduce the number of existing 320 acre habitat patches in greater than 15 percent canopy cover from nineteen to three. Because the lek buffer proposed in this alternative is smaller than those proposed in Alternative C and G, only three of the habitat patches would be converted to 0-5 percent canopy cover class, and thirteen patches would convert to the 6-15 percent canopy cover class. Only three patches would remain in the greater than 15 percent canopy cover class.

Fragmentation as a result of early seral stands would be dispersed across the Grasslands but the light herbicide treatments will leave sagebrush canopy, allowing greater connectivity across the area.

Figure 4.24 displays an estimation of the results of treatments and succession on canopy cover classes in Year 10 on the acres outside of the buffer zones. The figure does not necessarily represent true on-the-ground conditions in Year 10. It is used only as a tool to show differences between the alternatives.

Figure 4.24. Alternative F
Estimated Acres of Sagebrush Canopy Cover
Outside .25-Mile Buffer
Year 10



Effects on Riparian Species

Effects would be similar to those described in Alternative C.

Table 4.51. Alternative F. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would increase moderately above currently low levels.
How well the alternative meets conservation measures	This alternative moves towards conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to increase slightly. Distribution should improve over the Grassland, but still not moving towards the potential distribution.

Effects on Sagebrush Species (Except Sage grouse)

The distribution of sagebrush canopy cover classes at the end of the decade would shift toward acres in the 6-15 percent canopy cover class, with fewer acres in the 0-5 percent class and a slight increase in the greater than 15 percent class. This shift would not meet PFC criteria for the

sagebrush type during the ten-year plan period. It would result in a trend toward meeting the criteria over the long-term. Treatments would result in an increase in available habitat for those species associated with more open stands, such as the short-eared owl and the long-billed curlew.

Sagebrush obligate nest on the ground under shrubs or they nest in the shrub layer. Removal of sagebrush could reduce production on these species on treated sites, since the birds would be unable to find nest sites.

Table 4.52. Alternative F. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	An 8% decrease would be expected in suitable habitat over the Grassland, and a 1% increase over the GCVA, based on sagebrush overstory. A 40-50% utilization level is predicted to be adequate to improve habitat for voles. Populations of short-eared owls would be expected to decrease from current levels on the Grassland and stay the same or slightly increase over the GCVA.
Long-billed curlew	An 8% decrease would be expected in suitable habitat over the Grassland, and a 1% increase over the GCVA, based on sagebrush overstory. Utilization levels of 40-50% and vegetation treatments would result in increased areas of suitable habitat for nesting. Populations of long-billed curlew would be expected to decrease from current levels over the Grassland and stay the same over the GCVA.
Columbian Sharp-tailed grouse	Approximately 91% of sagebrush acres would remain in greater than 5% canopy cover. Bulbous bluegrass treatments would be seeded with native seeds mixes, increasing understory diversity over 2500 acres. Utilization levels of 40-50% will increase overhead nesting cover and would be expected to improve nesting success. Mountain brush treatments would reduce potential wintering habitat on the Grassland by treating 15 percent of the existing mountain brush acres. Populations of sharp-tailed grouse would be expected to increase over current levels.
Pygmy rabbit	A 1% increase would be expected in suitable habitat over the Grassland, and a 2% decrease over the GCVA, based on sagebrush overstory. Fragmentation would increase, with a drop from 19 to 3 in the number of sagebrush patches greater than 320 acres in denser stands. Bulbous bluegrass treatments would be seeded with native seed mixes, increasing understory diversity over 2,500 acres but would not be suitable for pygmy rabbits for 20-25 years (until sagebrush density reaches at least 15%). Populations and distribution would be expected to decrease from the current levels over the Grassland and GCVA.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative avoid vegetation treatments with 0.25 miles of active sage grouse leks in habitats considered suitable for sage grouse nesting and brood rearing.

Over the ten-year plan period, sagebrush would be managed to provide 60 percent of sagebrush acres in greater than 15 percent canopy cover. Approximately 2,500 acres would be treated, where bulbous bluegrass dominates the understory, using prescribed fire, plowing and reseeding with a native only seed mix. Acres treated with prescribed fire would shift into the 0-5 percent canopy cover class. Succession over the ten-year period would continue to shift existing younger stands into denser canopy classes, creating additional sage grouse habitat. A short-term reduction in the number of acres of nesting habitat during treatment periods could result, but overall acres of nesting habitat will increase. Sharp-tailed grouse would be minimally impacted during the ten-year plan period and over the long-term.

The desired future condition defined for this alternative would result in a mosaic of sagebrush acres, where 10 percent would be in the 0-5 percent class, about 50 percent would be in the 6-15 percent class, and about 40 percent would be in the greater than 15 percent canopy cover class. A reduction from existing conditions in nesting habitat for sage grouse would occur, which in turn could result in a reduction in population numbers. Sharp-tailed grouse, more of a habitat generalist, would not be affected by a reduction in sagebrush canopy cover.

Upland vegetation would be established at 40 to 50 percent for both native and non-native vegetation. This increase in residual vegetation height over existing conditions would improve nesting success and brood survival for sage grouse and sharp-tailed grouse and would be more beneficial for all other wildlife species.

Bulbous bluegrass treatments would be reseeded with native seed resulting in an improvement in understory diversity. Treated sites would not be suitable for nesting sage for twenty-five to thirty years.

Light herbicide applications would reduce canopy cover to 6-15 percent. Treatments would reduce available sage grouse nesting habitat until canopy cover reaches greater densities after treatment. Some slight improvement in understory production and vigor could be expected as a result of opening the canopy cover.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

Proposals for travel plan changes are more restrictive in this alternative than in Alternative A and B. The snow-free season travel would be restricted to designated routes. Restricted travel during breeding may reduce disturbance to displaying and nesting grouse and slightly increase nesting. A slight reduction in disturbance to leks and nest sites would be expected.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative F for a discussion on potential erosion rates, based on treatments proposed in each alternative. The Vegetation Understory section under Alternative F discusses changes in understory composition and structure in relationship to proposed treatments in this alternative).

Land use practices have the potential to increase erosion and exotic plants. Bulbous bluegrass treatments on 2,500 acres should result in improved understory and water infiltration. Herbicide treatments on 9,600 acres would open up sagebrush overstory and should result in an improvement in understory abundance and diversity of forbs. Mitigation and design features would minimize exotic or undesired plant establishment.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with a canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Winter cover for sage grouse would be slightly reduced as sagebrush acres greater than 25 percent canopy cover are treated. A reduction in winter survival of sage grouse would be expected, depending on the size, location and timing of treatments relative to other disturbances.

Overall Compliance with Sage Grouse Guidelines

Alternative F partially meets the guidelines. A slight increase would be expected in the number of sagebrush acres in the greater than 15 percent canopy cover class. Utilization rates suggest an increase in residual vegetation at the end of the grazing season. Using native seeds only to restore bulbous bluegrass sites would increase understory diversity. Placing motorized recreationists on designated routes would decrease the potential for disturbance to breeding and nesting birds.

Miles of Tree Rows at the End of the Decade

Effects would be the same as those described under Alternative A.

Cumulative Effects:

See page 4-197 and 4-204.

Irretrievable and Irreversible Effects:

An irretrievable loss of sage grouse nesting habitat would occur on 9,600 acres currently in greater than 15 percent canopy cover until canopy cover reaches greater than 16 percent, generally ten years. An irretrievable loss of sage grouse nesting habitat would occur on 2,500

aces until sagebrush re-invades and reaches greater than16 percent canopy cover, generally twenty to thirty years.

An irretrievable loss of native understory on 2,500 acres for ground-nesting and ground-foraging birds could be expected on bulbous bluegrass treated sites until vegetation reestablishes, generally five years.

●Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative F proposes 46,594 acres as suitable for livestock grazing. Based on these acres, the 40-50 percent utilization level for native and non-native vegetation, and the 30 percent utilization for riparian areas proposed in this alternative, calculations for forage production and head months were calculated for the existing situation (Year 0) and Year 10.

Direct/Indirect Effects:

Treatments in this alternative focus on achieving properly functioning condition of the various vegetation types on the grassland and bringing riparian areas into a properly functioning condition.

Calculations for estimated forage production indicate potential head months would range from 14,600 to 29,800 compared to 21,400 head months currently permitted.

Table 4. 53. Alternative F
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	38.4 M	14,600-20,800	(-)
Year 10	36.6 M	14,200-19,200	(-)

[1] Shown in millions of pounds and includes all vegetation – sagebrush, mountain brush and riparian.

During the ten-year plan period, forage production would decrease from about 38.4 million pounds to about 36.6 million pounds. More acres would be maintained in the greater than 15 percent canopy cover at the end of the ten-year plan period. As production falls, a decrease in head months from Year 0 would be necessary to maintain livestock grazing at sustainable levels.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if vegetation treatments were to continue, forage production would increase as desired sagebrush canopy covers were achieved. More acres would be in the higher production canopy cover types, generally 0-5 percent and 6-15 percent, with fewer acres in the greater than15 percent canopy cover class. Any additional forage would be available to meet resource management objectives at that time.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Utilization levels and treatments proposed in this alternative would result in a decrease in grazing head months at the end of the ten-year plan period. This decrease would be an irretrievable loss.

An average of 1,400 acres would be unavailable for livestock grazing beginning in year five of the ten-year plan period. The loss of head months as a result of treatments would be an irretrievable loss during treatment periods or until grazing resumes.

Herbicide treatments on the proposed 9,600 acres would not affect livestock grazing. Grazing would continue while the acres are being treated. No irretrievable loss would occur on these areas.

No irreversible effects have been identified for this alternative.

Alternative G

Summary Description of Treatments

Alternative G would allow livestock grazing on 46,475 suitable acres. The remaining 1,125 acres would not be suitable for livestock grazing.

Alternative G would treat 5,000 acres of sagebrush over the next ten years. No mountain brush would be treated. Approximately 2,500 acres outside of bulbous bluegrass sites that have canopy cover in greater than 15 percent would be treated using herbicides only to attain 6-15 percent canopy over the next ten years. The majority of sagebrush would be managed for mid and high canopy cover.

Table 4.54 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.54. Alternative G
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome of Treatments Percent of Sagebrush Acres	Desired future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	10% of acres	10% of acres
6%-15% canopy cover	24% of acres	19% of acres	50% of acres
Greater than 15% canopy cover	59% of acres	71% of acres	40% of acres

This alternative would treat 2,500 acres of bulbous bluegrass in the sagebrush in the greater than 15 percent canopy cover. Treatments would include prescribed fire, plowing, and reseeding. Revegetation would use native and non-native/introduced species in the seed mix. Treated sites would generally tend to be at least 500 acres or larger.

Alternative G would establish two utilization levels to achieve desired vegetation conditions. All perennial riparian areas would be fenced and water gaps added, with the exception of existing riparian pastures. Riparian pastures would be grazed at 30 percent utilization on the greenline. Upland utilization levels would be established at 40-50 percent for both native and non-native vegetation.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

●Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative G would treat about 500 acres each year during the ten-year plan. About 250 acres per year would be treated using prescribed fire. About 2,500 acres of bulbous bluegrass would be treated over the decade. Current bulbous bluegrass treatment methods require no less than five years to recover ground cover to a minimum of 60 percent for soil protection. Prescribed fire treatments require two to four years to recover vegetation ground cover to a minimum of 60 percent for soil protection.

Over the ten-year plan period, up to 1,250 acres (about 3 percent of Grassland watersheds) could be in a disturbed condition each year, once the treatment program reaches the fifth and subsequent years. If these treated sites are dispersed across several watersheds, impacts to overall watershed stability could be less than if impacts were concentrated in a single watershed.

Proposed treatments in this alternative specifically identify 2,500 acres of bulbous bluegrass dominated sites `where ground cover currently averages less than 60 percent. After treatment and reseeding with a blend of native and non-native seeds, ground cover on these sites would be maintained at or above 60 percent.

Prescribed fire treatments on 2,500 acres, outside of bulbous bluegrass areas, would rely on natural regeneration. Vegetation that exists prior to treatment would be expected to regenerate after treatment. Ground cover potential on these sites would remain at less than 60 percent on non-native and greater than 60 percent on native sites.

Surface runoff would increase on areas treated by plowing, burning or a combination of the two, which has a direct effect on erosion and sediment. The lack of protective cover during treatment would increase the potential for soil displacement and transport.

Prescribed fire treatments would not substantially alter the productivity of the soil. Most, if not all, vegetative ground cover would be initially lost following fire. Until vegetation is reestablished, surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement. If the treatment area is plowed, similar conditions to fire would occur; however, plowing can alter the soil profile by mixing soil layers. From plowing, infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff would increase over natural rates on these sites.

Using the Forest Service WEPP Model, predicted increased erosion rates at the site-specific level can range from near 0 tons per acre to nearly ten tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have increased erosion rates ranging from 0 tons to about 1.4 tons per acre, depending on the intensity of precipitation

following the treatment. Using this field scenario and assuming up to 1,250 acres[5] could be in a disturbed condition beginning in year five of the treatment program proposed in this alternative, increased erosion rates could range from near 0 tons to as much as 1,750 tons per year. If increased runoff and erosion from treated sites cause primary channels to adjust, watershed stability could be affected.

Livestock grazing would occur at lower utilization rates than Alternative A or E. In this alternative, utilization would be reduced about 10-20 percent from current utilization levels. This use level would tend to slightly improve overall ground cover potential. Microbiotic crusts would continue to be impacted by hoof action, which would tend to degrade this form of soil protection.

Restricting vehicle use to designated routes would reduce impacts from "road pioneering." Pioneered roads can cause deteriorated watershed conditions, especially on steeper slopes, where runoff water can concentrate in wheel tracks and ruts and create rills and gullies. Keeping vehicles on maintained roads and trails would reduce overall erosion potentials and maintain watersheds in an overall healthier condition.

Overall watershed condition, particularly where vegetation treatments are occurring, would be expected to decline initially, but as ground cover is reestablished conditions would improve or be slightly better than existing conditions. Overall ground cover would improve slightly in bulbous bluegrass treatment areas by reseeding with a blend of native and non-native seed mix that provides greater ground cover potential.

Watershed condition within the Grassland would improve slightly overall. Total watershed ratings for both public and private lands would not be expected to substantially improve without soil conservation, runoff and erosion control efforts watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed or trampled and ground litter is removed from a site, the site is degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer be a viable ground cover source. As long as these conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass areas, potential ground cover is less than the sites that are dominated by native and other desirable non-native plant species. Watershed condition would be maintained at less than potential in these bulbous bluegrass areas. As long as undesirable non-native species dominate a site, ground cover potential would be irretrievably lost.

[5] Only those acres burned and/or plowed are considered hydrolgically disturbed. Areas treated with herbicides are not considered hydrologically disturbed.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which would increase runoff and erosion potential.

No management activities are proposed in this alternative that would cause an irreversible commitment of resources.

Riparian Condition

Alternative G proposes two riparian grazing strategies. About half of the riparian areas would be fenced to exclude livestock grazing, except on a periodic basis, once every five years, under specific utilization standards. Exclosures would be 75 feet on either side of non-fish bearing streams and 150 feet on either side of fish-bearing streams. Water gaps would be placed at intervals along exclosed areas to allow access to water by livestock. The remaining riparian areas would be fenced as riparian pastures with parameters established for allowable stream bank disturbance and utilized at 30 percent or to six-inch stubble height at the end of the grazing season.

Direct and Indirect Effects:

In this alternative the overall density, composition and vigor of riparian vegetation would improve as a result of reduced grazing pressure by reducing greenline forage utilization by about 50 percent from current levels. Improvement would be more pronounced in the exclosed areas that exclude livestock than in the riparian pastures where grazing is allowed. Plants that have been suppressed because of grazing impacts would begin to reestablish in both areas, but at a slower rate in the riparian pastures. Stream banks would begin to stabilize as riparian vegetation increases in density and vigor and more desirable deep-rooted species reestablished. Although water gaps would be a point of more intense disturbance, if properly "hardened," these gaps should not be a substantial source of sediment or channel instability. Bank stabilization would generally progress more rapidly in the exclosed areas than in the riparian pastures, depending on the channel type and overall channel condition.

The riparian pasture along South Fork Rock Creek should help reduce the overall sediment loading of this 303(d) water quality limited stream. Specific guidelines for allowable streambank disturbance and lower livestock utilization rates proposed in this alternative should reduce sediment loading to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams fenced into riparian pastures would improve as grazing impacts to riparian areas and stream channels are reduced. Allowable uses and disturbances in riparian pastures become more restrictive as inherent channel resiliency and channel/riparian functioning condition decrease. For those stream reaches that will be corridor-fenced in this alternative, water quality should improve as livestock grazing is removed from these areas. This alternative meets the intent of the Clean Water Act and Idaho's antidegradation policy.

Improvements in the density and vigor of riparian vegetation would be followed by improvements to overall channel condition. Improvements could be expected as soon as a few

years, particularly on streams that have been assessed as properly functioning or functioning-at-risk. More degraded channels, assessed as functioning-at-risk to nonfunctioning, would require more time to heal. Channels that have been deeply downcut may take decades to recover as evolutionary processes stabilize the channel. Upstream influences from agricultural farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence channel stability and vegetation growth within the Grassland.

Upland vegetation treatments that include burning and plowing have the potential to increase runoff and downstream sediments. Increased sediment loading could cause substantial impacts to downstream water quality, depending on the location of the treatment and the amount of erosion that occurs as a result of the treatment. (See Watershed discussion under Alternative G.) Increases in water yields and sediment would occur two to four years following burning, with the greatest potential increases occurring during the first year following treatment. As the density of riparian vegetation increases, the capacity of riparian vegetation to filter upland-generated sediment and nutrients also increases. The filtering capacity of streamside vegetation would improve the fastest within the exclosed areas, followed by reaches within riparian pastures. Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases are relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions.

Long-term improvements in overall water quality would be realized over current conditions. If any new streams within or directly adjacent to the Grassland were to be listed by the State some time in the future as not meeting beneficial use standards and listed as a 303(d) stream, grazing standards should generally be sufficient to improve degraded water quality conditions to a level that would meet state TMDL requirements. Impacts to riparian areas from upland vegetation treatments would need to be evaluated on a site-specific, project-by-project basis.

Impacts from adjacent lands in other ownerships would presumably continue at present rates. These impacts from other land ownership would play a primary role in the success of any improvement on the Grassland, even with reduced disturbance on Forest Service administered areas proposed in this alternative. Marginal improvements in overall water quality could be expected for the watersheds.

Approximately fourteen miles of stream in riparian exclosures would greatly improve overall channel stability and water quality within the Grassland. The ten miles of stream currently in riparian pastures would improve moderately. The overall rate of recovery would be moderately fast compared to Alternative A, specifically within riparian exclosures. The rate of recovery in riparian pastures would be moderate and somewhat slower than the riparian exclosures.

The Grasslands occupy only a small percentage of the total Curlew Valley watersheds. Impacts from adjacent lands in other ownerships would presumably continue at present rates. Because these lands occupy the majority of the overall watersheds, impacts from these lands would temper any riparian, stream channel, water quality and/or aquatic habitat improvements made within the Grasslands, resulting in marginal overall improvements for the watersheds as a whole.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality would be irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area would depend on the extent of the degradation and the corrective actions taken. Riparian areas within fenced pastures should recover slowly over one or more decades. Riparian areas within the exclosures would recover more quickly.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many have been degraded to the point that it would be impractical to restore them to a pre-disturbed condition. Through prudent management practices, some of these channels could be stabilized in the existing condition and overall stability improved; however, to be fully functional, some of these channels would have to undergo an evolutionary process that could take decades. In these cases, a pre-disturbance channel condition is no longer achievable and would be considered an irretrievable and irreversible commitment of this resource.

●Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

The effects of the proposed treatments in this alternative on sagebrush canopy cover, sagebrush succession and Vegetation Properly Functioning Condition are discussed below.

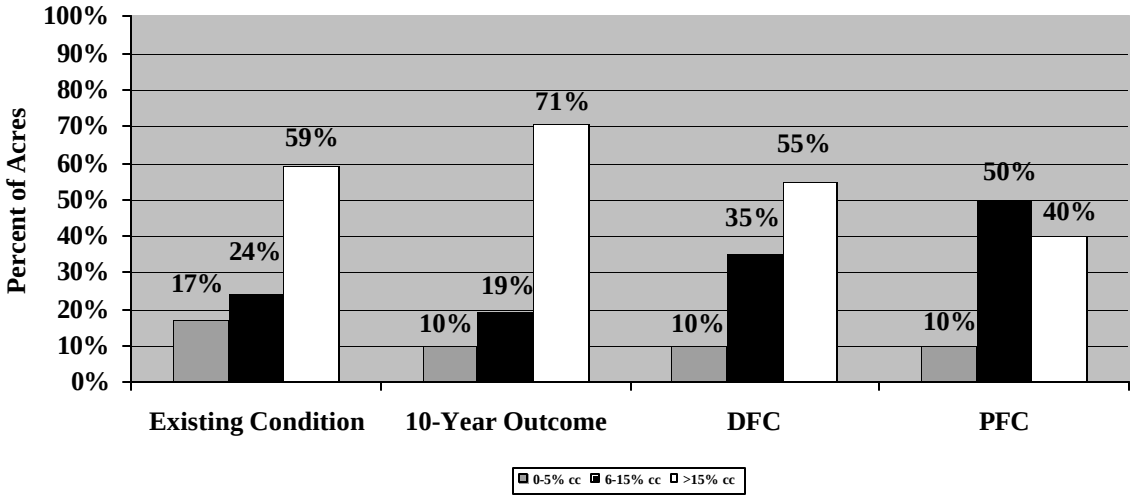
Direct and Indirect Effects:

Curlew National Grassland

Treatments and natural succession in this alternative would reduce the number of sagebrush acres in the 0-5 percent canopy cover class by about 7 percent during the ten-year plan period. A decrease of about 5 percent would occur in the number of sagebrush acres in the 6-15 percent canopy cover class. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by about 12 percent.

Figure 4.25 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, and the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.25. Alternative G
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and the VDDT Model.

The ten-year projected outcome of natural succession and treatments proposed in this alternative would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require additional treatments on sagebrush acres in the greater than 15 percent canopy cover to increase the number of sagebrush acres in the 6-15 percent canopy cover. Additional treatments in the 0-5 percent canopy cover would be needed to maintain acres in this canopy cover class. Over the long-term (50 to 100 years), succession and treatments in future decades would trend the sagebrush cover type toward the late seral stage for the majority of sagebrush acres. In the long-term (50 to 100 years), succession and treatments will trend sagebrush on the Grassland toward late seral ecological status on the majority of sagebrush acres.

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.55.

Table 4.55. Alternative G. Ten-Year VDDT Outcome on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	10%
6-15% canopy cover	19%
16-25% canopy cover	24%
>25% canopy cover	47%

The sagebrush cover type on the Grassland would not meet sagebrush PFC criteria during the ten-year plan period. Over the long term, with additional treatments in subsequent decades, sagebrush acres would trend toward the range for PFC structure, composition, and patterns but

would favor sagebrush structure in a late seral stage. Patterns would continue to be influenced by land practices private lands adjacent and within the Grassland boundary.

When disturbances occur, such as lethal fire, an increased risk of undesirable and non-native plant invasion may also occur. Shrubs that sprout after fire, such as threetip sagebrush and rabbitbrush, may increase and even become dominant. Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

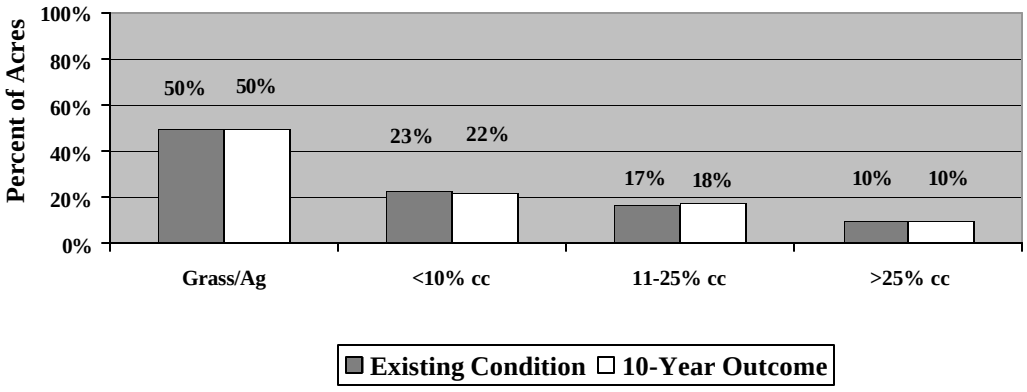
Managing Grassland resources under Alternative G would maintain the sagebrush system at a **low** to **moderate** magnitude of departure from the historic range of variation. This degree of departure would maintain the system's resiliency and ability to recover after disturbance over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 83,100 acres, a reduction of about 9 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria.

Figure 4.26 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade.

Figure 4.26. Alternative G
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irretrievable or irreversible effects have been identified for this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative does not identify any mountain brush acres for treatment. The effects will be similar to Alternative A.

Vegetation Understory Composition

Direct and Indirect Effects:

No prescribed fire treatments are proposed outside of bulbous bluegrass sites in this alternative. Existing understory vegetation on untreated crested wheatgrass and native range sites would continue to decline in diversity and vigor as sagebrush canopy cover increases over time.

Light herbicide applications, such as Tebuthiron, would occur on 2,500 acres to thin sagebrush acres in greater than 15 percent canopy cover to achieve a 6-15 percent canopy cover. An increase in understory forage production would be expected in the second year following treatment. If herbicide treatments are applied on crested wheatgrass sites, understory forage production would increase on these sites as more moisture and nutrients become available. Species diversity in the understory would remain unchanged overall.

Herbicide applications on native vegetation would reduce the canopy cover somewhat by killing some sagebrush, allowing more moisture and nutrients to reach the existing understory vegetation. Grasses and forbs existing on the site would be expected to increase in vigor and density after treatment.

Prescribed burning, plowing and reseeding bulbous bluegrass sites with native species would improve understory diversity and increase forage production. If bulbous bluegrass treatment areas are adjacent to other untreated areas where the canopy cover is denser and the understory is primarily composed of non-native species, grazing overuse on restored bulbous bluegrass sites is likely to occur. As the diversity and palatability of understory species increase, grazing animals would select these sites, because they offer diversity not generally available to them. As a result, grazing animals would graze these sites heavily before returning to other less palatable vegetation. Selective grazing is a major factor affecting rate, direction and magnitude of ecological

succession, because the competitive abilities of individual plants are altered by frequency and severity of defoliation. If these sites are overgrazed, an invasion of annuals and other non-desirable plants could be expected. Where small, treated patches are adjacent to or intermingled with untreated bulbous bluegrass sites or crested wheatgrass sites, invasion by these species would occur as the native plants become stressed and lose vigor.

This alternative proposes a 30 percent or six-inch stubble height in riparian zones and a 40-50 percent livestock use level on native and non-native sites.

The expected consequences of this level of livestock use would be the same as those described in Alternative F for native and non-native sites.

In riparian zones, the consequences would be the same as those described in Alternative B.

This alternative provides an opportunity to improve understory diversity and production on 2,500 acres of existing bulbous bluegrass sites. Some increase in understory diversity and production could be expected on sagebrush acres treated with an herbicide, but not to the same extent as treatments on bulbous bluegrass sites. Approximately 2,700 acres of bulbous bluegrass would remain untreated at the end of the ten-year plan period. These sites would continue to display a lack in understory diversity and low herbaceous production.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of forage on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with it also could be causing an irretrievable effect yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation reestablishes.

Wildlife Habitat Management

Direct and Indirect Effects:

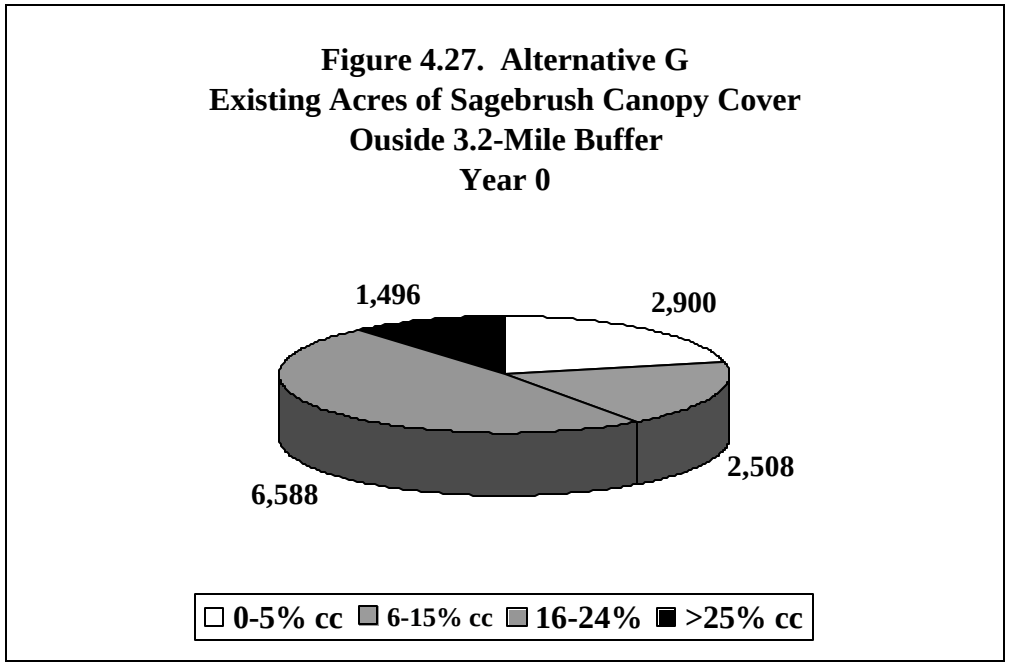
Effects on Sagebrush Habitat

Alternative G proposes a 5-kilometer (3.2 miles) buffer zone around occupied sage grouse leks, except where bulbous bluegrass is present. Although vegetation treatments would be permitted within the buffer zones to improve sage grouse habitats, it is assumed that treatments would occur outside of the buffer zone first. Treatments within the buffer zone would be designed to improve sage grouse habitat. Vegetation treatments in relationship to occupied lek locations would be analyzed at the site-specific level prior to treatment. Buffer zones in this alternative would encompass about 75 percent of the Grassland. The remaining 25 percent would be available for the first treatments.

Table 4.56. Alternative G. Changes in Percentage of Acres in Sagebrush Canopy Cover Over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	10%	50%	50%
6-15% cc	24%	19%	23%	22%
16-24% cc	42%	24%	17%	18%
>25%	17%	47%	10%	10%

Figure 4.27 displays the existing acres of sagebrush canopy cover classes outside the 3.2-mile buffer zones using 1991 lek location information.

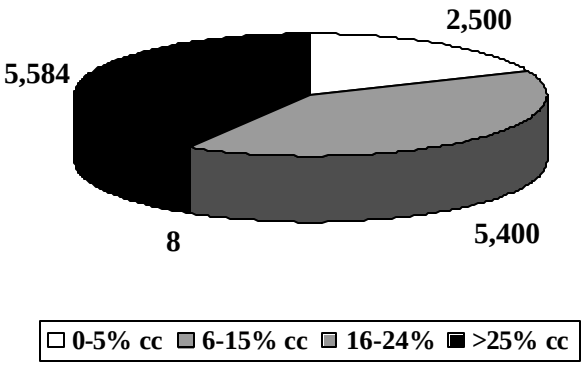


Alternative G proposes light herbicide applications on 2,500 acres in greater than 15 percent canopy cover. Based on 1991 lek locations, treatments could begin in three distinct areas of the Grassland. Approximately 47 percent of sagebrush acres with canopy cover greater than 15 percent would be treated outside the buffer zones. Habitat fragmentation would be limited to the 2,500 acres of bulbous bluegrass, approximately three treatment units where treatments result in 0-5 percent sagebrush canopy cover class. Herbicide treatments would result in patchy

sagebrush stands of more diverse canopy cover classes rather than eliminating the entire overstory. Habitat connectivity outside the buffer would be somewhat reduced, but overall connectivity would be improved within the ten-year plan period. Treatments proposed could reduce the number of existing 320-acre habitat patches in greater than 15 percent canopy cover from nineteen to twelve.

Figure 4.28 displays an estimation of the results of treatments and succession on canopy cover classes in Year 10 on the acres outside of buffer zones. The display does not necessarily represent true on-the-ground conditions in Year 10. It is used here as a tool to show differences between alternatives.

Figure 4.28. Alternative G
Estimated Acres of Sagebrush Canopy Cover
Outside 3.2-Mile Buffer
Year 10



Effects on Riparian Species

This alternative offers the best opportunity, other than Alternative D, to improve streamside vegetation and increase the extent of the riparian zone. All perennial streams not currently in riparian pastures would be fenced to provide a special riparian/wetland emphasis area (RWA). Non-fish bearing streams would be fenced 75 feet on either side of the stream. Fish-bearing streams would be fenced 150 feet either side of the stream. Livestock would be excluded from these areas, except for periodic grazing once every five years to maintain plant vigor. Livestock riparian pasture utilization levels would retain 6 inches of vegetation height or not more than 30 percent utilization on the green line, whichever occurs first. Sage and sharp-tailed grouse use riparian areas for late spring and early summer brooding, because of succulent vegetation and insects that are available. Suitability for this use would be greatly improved under this alternative.

Areas inside existing riparian pastures would be expected to continue in an upward trend. As the functioning of the stream channel and vegetative structure increase, habitat for breeding birds

would increase. Vegetation on the functioning stream reaches would continue to provide suitable habitat for nesting birds where it currently exists. Fencing in the remaining riparian areas and excluding livestock grazing should result in a faster improvement of vegetative structure where streams are in properly functioning condition or functioning-at-risk. The extent of riparian habitat would increase providing additional habitat. Some of functioning-at-risk stream reaches with suppressed and browsed willows would most likely improve. Improvements, however, may not provide sufficient structure for shrub nesters during the ten-year plan period. Non-functioning streams could see slight improvement or stabilization of existing conditions.

Table 4.57. Alternative G. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Habitat would increase above currently low levels. This alternative would see the greatest improvements in habitat, but is limited by the potential of the stream reaches and willow habitats to substantially improve over the 10-year period.
How well the alternative meets conservation measures	This alternative meets conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to increase. Distribution should improve over the Grassland, and should move towards the potential distribution.

Effects on Sagebrush Species (Except Sage grouse)

The distribution of sagebrush canopy cover classes at the end of the decade is expected to shift more acres into the greater than 15 percent canopy cover class, with fewer acres in the 0-5 and 6-15 percent classes. This shift would not meet PFC criteria for the sagebrush type during the ten-year plan period, but it would result in a trend toward meeting the criteria over the long-term. Treatments would result in an increase in available habitat for those species associated with denser canopy cover. A reduction in available habitat on the Grassland would be expected for species associated with more open stands, such as the short-eared owl and long-billed curlew.

Sagebrush associated species generally nest on the ground under shrubs or in taller sagebrush plants. The removal of sagebrush could reduce the production of these species on treated sites. However, sagebrush canopy cover would increase during the ten-year plan period, providing more potential habitat for these species.

Lower utilization rates would result in an increase in residual vegetation height at the end of the grazing season. An increase in residual vegetation height would improve nesting success and brood survival for species using grassy understory for foraging or cover.

Table 4.58. Alternative G. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	A 7% decrease would be expected in suitable habitat over the Grassland, and a 1% decrease over the GCVA, based on sagebrush overstory. A 40-50% utilization level is predicted to be adequate to improve habitat for voles. Populations of short-eared owls would be expected to decrease from current levels on the Grassland and stay the same or slightly increase over the GCVA.
Long-billed curlew	A 7% decrease would be expected in suitable habitat over the Grassland, and a 1% decrease over the GCVA, based on sagebrush overstory. Utilization levels of 40-50% and vegetation treatments would result in increased areas of suitable habitat for nesting. Populations of long-billed curlew would be expected to decrease from current levels over the Grassland and stay the same over the GCVA.
Columbian Sharp-tailed grouse	Approximately 90% of sagebrush acres would remain in greater than 5% canopy cover. Bulbous bluegrass treatments would be seeded with native or non-native seed mixes, increasing understory diversity over 1,250 acres. Utilization levels of 40-50% will increase overhead nesting cover and would be expected to improve nesting success. Populations of sharp-tailed grouse would be expected to increase over current levels.
Pygmy rabbit	A 12% increase would be expected in suitable habitat over the Grassland, and no change over the GCVA, based on sagebrush overstory. Fragmentation would increase, with a drop from 19 to 12 in the number of sagebrush patches greater than 320 acres in denser stands. Bulbous bluegrass treatments would be seeded with native or non-native seed mixes, increasing understory diversity over 1,250 acres but would not be suitable for pygmy rabbits for 20-25 years (until sagebrush density reaches at least 15%). Populations and distribution would be expected to increase from the current levels over the Grassland and stay the same over the GCVA.

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative avoid vegetation treatments within 3.2 miles of occupied sage grouse leks, except where bulbous bluegrass is present.

Over the ten-year plan period, sagebrush would be managed to provide 71 percent of the sagebrush acres in greater than 15 percent canopy cover. Approximately 2,500 acres would be treated, where bulbous bluegrass dominates the understory, using prescribed fire, plowing and reseeding with a blend of native and non-native seed. Acres treated would shift to the 0-5 percent cover class. Succession over the ten-year period would continue to shift existing younger stands into denser canopy cover classes creating additional sage grouse nesting habitat.

The desired future condition defined for this alternative would result in a mosaic of sagebrush acres, where 10 percent would be in the 0-5 percent class, 35 percent would be in the 6-15

percent class, and 55 percent of the sagebrush acres would be in greater than 15 percent canopy cover. This desired condition would meet this guideline over the long-term.

Upland vegetation would be established at 40 to 50 percent for both native and non-native vegetation. Lower utilization rates would result in an increase in residual vegetation height after the grazing season. An increase in residual vegetation would improve nesting success and brood survival for sage and sharp-tailed grouse.

Bulbous bluegrass and herbicide treatments on 2,500 acres would decrease sagebrush overstory and improve understory forbs diversity for about ten years after treatment. Site restoration would use a blend of native and non-native seeds. All treated acres would see an initial improvement in understory diversity. As sagebrush reestablishes, understory diversity would be expected to decline for twenty-five to thirty years.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

Restricted travel during breeding may reduce the potential for disturbance to displaying and nesting grouse and slightly increase nesting. A slight reduction in disturbance to leks and nest sites would be expected.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative G for a discussion potential erosion rates, based on treatments proposed in each alternative. The Vegetation Understory section under Alternative G discusses changes in understory composition and structure in relationship to proposed treatments in this alternative.)

Alternative G proposes to treat 2,500 sagebrush acres, where bulbous bluegrass dominates the understory, using prescribed fire, plowing and reseeding with a blend of native and non-native seed. Treatments typically take five to six years to complete. Reduced soil moisture effectiveness and increased erosion would be expected on these sites until vegetation reestablishes. The abundance of forbs and other native and non-native species would be expected to increase after treatment.

Approximately 2,500 acres of sagebrush in greater than 15 percent canopy cover would be treated with a light herbicide application to reduce canopy cover to 6-15 percent. Treatments using herbicides do not disturb the ground. No increase in erosion is expected on these sites. Canopy cover reduction should expose the existing understory to more sunlight, water and nutrients. Understory forbs diversity would increase over the ten-year plan period.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with a canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Winter cover for sage grouse would be slightly reduced as sagebrush acres greater than 25 percent canopy cover are treated. A reduction in winter survival of sage grouse would be expected, depending on the size, location and timing of treatments relative to other disturbances.

Overall Compliance with Sage Grouse Guidelines

Alternative G meets the guidelines. A 12 percent increase would be expected in the number of sagebrush acres in the greater than 15 percent canopy cover class. Utilization rates suggest an increase in residual vegetation at the end of the grazing season. Using a mix of non-native and native seeds to restore bulbous bluegrass sites would increase understory diversity. Placing motorized recreationists on designated routes would decrease the potential for disturbance to breeding and nesting birds.

In this alternative, there would be approximately thirteen miles of new fence constructed along riparian areas (4 percent increase). To be effective at excluding livestock from the riparian areas, fences will probably be at least four wires. Sage grouse guidelines (Connelly *et al.*, 2000,), say "increase visibility of fences within one kilometer of seasonal ranges by flagging or similar means if these structures appear hazardous to flying grouse". This will be implemented at a site-specific level, looking at adjacency to known highly used lek sites and other important factors.

Miles of Tree Rows at the End of the Decade

Effects are the same as those described under Alternative A.

Cumulative Effects:

See page 4-197 and 4-205.

Irretrievable and Irreversible Effects:

An irretrievable loss of sage grouse nesting habitat would occur on 2,500 acres currently in greater than 15 percent canopy cover until canopy cover reaches greater than 16 percent, generally ten years. An irretrievable loss of sage grouse nesting habitat would occur on 2,500 aces until sagebrush re-invades and reaches greater than16 percent canopy cover, generally twenty to thirty years.

An irretrievable loss of native understory on 2,500 acres for ground-nesting and ground-foraging birds could be expected on bulbous bluegrass treated sites until vegetation reestablishes, generally five years.

●Economic and Social Values

Economics

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative G proposes 46,475 acres as suitable for livestock grazing. Based on these acres, the 45 percent utilization level for native and non-native vegetation, the 30 percent utilization for riparian areas, and vegetation treatments proposed in this alternative, calculations for forage production and head months were calculated for the existing situation (Year 0), Year 10 and Year 50, when it is assumed desired sagebrush canopy cover will be in place.

Direct and Indirect Effects:

Treatments in Alternative G are designed to improve rangeland conditions while providing the quality and quantity of wildlife habitat necessary to sustain viable populations of sagebrush obligate species, particularly the sage grouse.

Calculations for estimated forage production indicate head months would range from 14,100 to 20,100 compared to the 21,400 head months currently permitted.

Table 4. 59. Alternative G
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	38.4 M	14,100-20,100	(-)
Year 10	33.6 M	13,000-18,200	(-)

[1] Shown in millions of pounds and include all vegetation types – sagebrush, mountain brush and riparian.

During the ten-year plan period, forage production would decrease from about 38.4 million pounds to about 33.6 million pounds. More sagebrush acres would be maintained in the lower production greater than 15 percent canopy cover class at the end of the ten-year plan period. As production decreases, an additional decrease in potential head months from Year 0 would be needed to sustain vegetation resources.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented

immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if treatments were to continue, forage production would most likely continue to decline as sagebrush canopy cover increases. More acres would be in the lower production canopy cover class, generally greater than 15 percent, with fewer acres in the 0-5 percent or 6-15 percent canopy cover classes.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Reduced utilization levels and treatments proposed in this alternative would result in an irretrievable loss of grazing head months in Year 0. Over the ten-year plan period an additional loss of head months would be expected and would be considered an irretrievable lost.

An average of 1,500 acres would be unavailable for livestock grazing during treatment periods over the ten-year plan period. The loss of head months on these acres during the treatment periods or until grazing resumes would be an irretrievable loss.

No irreversible effects have been identified for this alternative.

Alternative H – Selected Alternative

Summary Description of Treatments

In Alternative H, livestock grazing would be permitted on 46,594 suitable acres. The remaining 1,006 acres would not be suitable for livestock grazing.

Alternative H would treat 12,100 acres of sagebrush over the next ten years with the objective to maintain the current level of sagebrush canopy cover density on the Grassland, particularly in the greater than 15 percent canopy cover class. Approximately 9,600 acres outside of bulbous bluegrass sites that have canopy cover greater than 15 percent would be treated using a combination of light and heavy herbicides or other treatments to increase the sagebrush acres in the 6-15 percent canopy cover class while maintaining the current level of sagebrush acres in the greater than 15 percent canopy cover class. The majority of sagebrush acres would be managed for 6-15 percent and greater than 15 percent canopy cover densities.

Table 4.60 below shows the existing condition of sagebrush canopy cover by class, the long-term goal of sagebrush treatments in this alternative, and the probable outcome of proposed treatments for the first ten years.

Table 4.60. Alternative H
Existing Condition, First Decade Outcome of Treatments, and Desired Future Condition of Sagebrush Canopy Cover Classes

Sagebrush Canopy Cover Classes	Existing Condition Percent of Sagebrush Acres	First Decade Outcome of Treatments	Desired Future Condition Percent of Sagebrush Acres
0%-5% canopy cover	17% of acres	9% of acres	17% of acres
6%-15% canopy cover	24% of acres	31% of acres	24% of acres
Greater than 15% canopy cover	59% of acres	60% of acres	59% of acres

This alternative would treat 2,500 acres of bulbous bluegrass in the sagebrush understory (2,200 acres in the greater than 15 percent sagebrush canopy cover and 300 acres in the less than 15 percent sagebrush canopy cover.) Treatments may include prescribed fire and deep-disc plowing. Revegetation would use a mix of native and desired non-native grasses, forbs and shrubs. Treatment size would vary from project-to-project based on Grassland Plan resource objectives.

Alternative H would establish a generic 50 percent utilization level grassland-wide to achieve desired vegetation conditions for both native and non-native vegetation; riparian utilization would be established at 20-50 percent based on the properly functioning condition of the stream. Lower utilization rates would be used where streams are not functioning or functioning at risk.

Editor's Note: Information regarding data used, methodology, or other explanatory or concept discussions appear only under the Alternative A discussion but also apply to all

alternatives. Additional rationale for the conclusions reached in this Chapter can be found in the affected environment discussions in Chapter 3. Where different or more information is needed to support conclusions, that information is displayed in the alternative discussion.

● Riparian and Watershed Management

Watershed Condition

Direct and Indirect Effects:

Alternative H would treat up to 1,210 acres each year during the ten-year plan period. About 960 acres a year would be treated using herbicides. About 2,500 acres of bulbous bluegrass would be treated over the ten-year plan period. Current bulbous bluegrass treatments methods require no less than about five years to recover ground cover to a minimum of 60 percent for soil protection. Prescribed fire treatment requires two to four years to recover vegetation ground cover to a minimum of 60 percent for soil protection, depending on fire intensity, soils and climatic conditions, depending on fire intensity, soils, and climatic conditions.

Over the ten-year plan period, up to 1,250 acres (about 3 percent of Grassland watersheds) could be in a disturbed condition at one time, once the treatment program reaches the fifth and subsequent years.[6] If these disturbed sites are dispersed across several watersheds, impacts to watershed stability within any single watershed could be less than if impacts were concentrated in a single watershed.

Proposed treatments in this alternative specifically identify 2,500 acres of bulbous bluegrass dominated areas where average ground cover is currently less than 60 percent. After treatment and reseeding with native or desirable non-native seed mixes, average ground cover on these sites would be improved to or above 60 percent or greater.

Vegetation that exists prior to prescribed fire treatment would be expected to regenerate after treatment. Ground cover potential on these sites would remain near pre-treatment levels over the long-term. Short-term ground cover would be reduced to near 0, with average recovery time ranging from two to four years.

The 9,600 acres proposed for treatment using herbicides would have negligible effects on watershed stability and condition. Herbicide treatments do not affect non-woody understory vegetation. Even though overstory canopy cover would be reduced, the density of the understory component in these areas would not substantially change as a result of the treatment.

Although sagebrush use more water than herbaceous understory vegetation, removing the woody overstory using herbicides should not affect total water yields. Herbaceous understory vegetation would use any additional water that may become available within their rooting zone. Long-term changes in runoff would be negligible on these sites.

[6] The 960 acres treated with herbicides each year are not considered to be hydrologically disturbed.

Surface runoff would increase on areas treated by plowing, burning or a combination of the two, which has a direct effect on erosion and sediment. The lack of protective cover during treatment would increase the potential for soil displacement and transport.

Prescribed fire treatments would not substantially alter the productivity of the soil. Following treatment, most, if not all, vegetative ground cover would be initially lost. Until vegetation is reestablished, short-term surface runoff potential would increase which would directly affect the amount of potential erosion and sediment movement. If the treatment area is plowed, similar conditions to fire would occur; however, plowing can alter the soil profile by mixing soil layers. From plowing, soil infiltration capacity could initially increase and runoff rates would decrease. If precipitation exceeds the absorption capacity of the soil at any time during the treatment period, runoff would increase over natural rates on these sites. Hydrologic recovery of sites would take two to four years following fire and up to five years following plowing treatments.

Using the Forest Service WEPP Model, modeled increased erosion rates at the site-specific level can range from near 0 tons per acre to nearly ten tons per acre based on slope and percent ground cover. For example, a treated field on a 5 percent slope could have increased erosion rates ranging from 0 tons to about 1.4 tons per acre, depending on the intensity of precipitation following the treatment (See Table 4.2). Using this field scenario and assuming up to 1,250 acres could be in a disturbed condition beginning in year five of the treatment program proposed in this alternative, an increase in erosion rates could range from near 0 tons to as much as 1,750 tons per year. If increased runoff and erosion from treated sites causes primary channels to adjust, overall watershed stability could be affected.

Livestock grazing would occur at lower utilization rates than Alternative A. In this alternative, upland utilization would be reduced about 10 percent, from current utilization levels. This use level would tend to maintain or slightly improve overall upland ground cover potential. Microbiotic crusts would continue to be impacted by hoof action, which would tend to degrade this form of soil protection.

Restricting vehicle use to designated routes would reduce impacts from "road pioneering." Pioneered roads can cause deteriorated watershed conditions, especially on steeper slopes, where runoff water can concentrate in wheel tracks and ruts and create rills and gullies. Keeping vehicles on maintained roads and trails would reduce overall erosion potentials and maintain watersheds in an overall healthier condition.

Short-term Watershed conditions within the Grassland would decline somewhat during vegetation treatments, but should improve over the long-term as non-native bulbous bluegrass sites are converted to native revegetated sites that provide greater ground cover potential (See Riparian discussion in following section for antidegradation and TMDL discussion).

Overall watershed conditions, which including includes all private and public land, would not be expected to substantially improve without soil conservation, runoff and erosion control efforts watershed-wide.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Once vegetation is consumed, plowed or trampled and ground litter is removed from a site, the site is degraded until vegetation reestablishes. If microbiotic crusts are trampled, they may no longer be a viable ground cover source. As long as these disturbed conditions persist, ground cover would be irretrievably lost.

On sites dominated by non-native species, specifically bulbous bluegrass areas, potential ground cover is less than the sites dominated by native plant species or other species having greater ground cover potential. Watershed condition would be maintained at less than potential in these areas. As long as non-native species, such as bulbous bluegrass, dominate a site, ground cover potential of native sites would be irretrievably lost.

As long as a road or trail is in place, an irretrievable loss of infiltration capacity of the soil would occur which results in increased runoff and erosion potential.

Riparian Condition

The major impacts to riparian areas within the Grassland are from livestock grazing and flooding. Floods are primarily generated from private lands located upstream from the Grassland. Periodic flooding will continue to occur as long as these uplands are farmed. Both grazing and flooding contribute to the overall degradation of water quality throughout the Grassland.

Alternative H proposes a 150-foot Riparian Wetland Area (RWA) as a special emphasis zone along streams that contain fish and a 75-foot zone along streams that do not contain fish. New livestock facilities would be placed outside RWAs. Riparian vegetation utilization levels by livestock would be established at 20-50 percent or a two- to six-inch stubble height, based on season of use, stream channel type, and current versus desired riparian conditions. This is a 10-40 percent reduction from current utilization levels. Specific bank disturbance criteria would also be implemented. No treatments are proposed in riparian areas.

Direct and Indirect Effects:

In this alternative, riparian livestock utilization levels are the same as those proposed in Alternative C and F. Based on the type of existing stream channel and the overall existing condition of riparian vegetation, a range of livestock vegetation utilization levels between 20-50 percent or two- to six-inch stubble height in RWAs would be used to maintain the integrity of riparian areas currently in good condition and improve those areas that are in degraded condition. Bank disturbance criteria would also be implemented. Implementing these more conservative grazing standards would allow attainment of the RWA goals. The potential for improving degraded stream channels and riparian areas would be greater in this alternative than in

Alternatives A, B, and E but less than Alternatives D and G. Fencing functioning-at-risk streams will improve overall conditions of those stream segments by removing grazing pressures. Grazing may occur within these fenced corridors periodically during the decade on a short duration basis to maintain streamside plant vigor and will be managed using the same standards discussed above. Grazing in these areas will be compatible with RWA goals and will meet state and federal water quality rules and regulations.

The riparian pasture along South Fork Rock Creek will serve to help reduce sediment loading of this 303(d) water quality limited stream. Specific guidelines for allowable streambank disturbance and lower livestock utilization rates in this alternative should reduce sediment loading generated within the Grassland boundary to a level that meets the State's Total Maximum Daily Load (TMDL) criteria for this stream. Water quality in other streams fenced into riparian pastures should improve slightly as more stringent grazing standards and guidelines are implemented and riparian conditions improve. Grazing standards and guidelines are more restrictive for channels that have a lower resiliency and/or have reduced functioning condition. . For those stream reaches that will be corridor-fenced in this alternative, water quality should improve as livestock grazing is removed from these areas. With the implementation of these grazing strategies and grazing standards and guidelines, the intent of the Clean Water Act and Idaho's antidegradation policy should be satisfied. However, overall water quality will continue to be less than desired because of the impacts of private lands throughout the Curlew Valley.

Comprehensive riparian standards and guidelines in this alternative should result in improvements in the density and vigor of riparian vegetation, followed by improvements to overall channel condition. Streams that have been assessed to be at properly functioning condition or functioning-at-risk would improve first. More degraded channels, assessed as functioning-at-risk to nonfunctioning, would require more time to heal. Channels that have been deeply downcut may take decades to recover as evolutionary processes re-form the channel. Upstream influences, particularly from agricultural farming, primarily in the form of flooding and increased sediment from plowed fields, would continue to influence channel stability and riparian vegetation growth.

Upland vegetation treatments that include plowing have the potential to increase runoff and downstream sediments. Sediment loading from upland vegetation treatments could cause substantial impacts to downstream water quality, depending on the location of the treatment and the actual amount of erosion that occurs as a result of the treatment. (See Watershed discussion under Alternative H). Increases in water yields and sediment would occur two to five years after burning or plowing, with the greatest potential increases occurring during the first year following treatment. With the reduction of streamside impacts, overall reductions in sediment, nutrients and bacteria delivered to area streams should be realized.

Nutrients, such as phosphates and nitrates, can increase as a result of burning, but these increases are relatively short-term. Nutrient loading can also increase as a result of livestock waste, but generally is not meaningful under open range conditions. No significant water quality problems should occur from the application of herbicides when they are used to reduce sagebrush canopy. No State or Federal standards should be exceeded if proper application procedures are followed. No threats to human, animal, insect or aquatic biota should result from herbicide treatments.

Long-term improvements in water quality would be realized over current conditions. If any new streams within or adjacent to the Grasslands are listed by the State of Idaho in the future as not meeting beneficial use standards and listed as a 303(d) stream, grazing standards should be sufficient to meet State TMDL requirements. Potential impacts to water quality from upland vegetation treatments would need to be evaluated on a site-specific, project-by-project basis.

Impacts from adjacent lands in other ownerships would presumably continue at present rates. These impacts from other land ownership play a primary role in the success of riparian improvements on the Grassland. Unless conservation practices from these other lands are improved, marginal improvements in overall water quality would be expected for the watersheds.

Approximately twenty-four miles of streams would improve. The rate of recovery would be faster than Alternative A, B, E, or F with the establishment of riparian pastures and specific vegetation use and bank disturbance criteria, and corridor fencing of functional-at-risk stream segments.

Cumulative Effects:

See page 4-195.

Irretrievable/Irreversible Effects:

Stable stream channels, healthy riparian area vegetation and adequate water quality are irretrievably lost as long as degraded conditions exist. Degraded conditions can be reversed if pressures within riparian areas are reduced. The recovery time needed to reverse or rehabilitate a specific stream or riparian area is dependent on the extent of the degradation and the corrective actions taken.

Stream channels within the Grassland have undergone similar disturbance patterns as those found throughout the Greater Curlew Valley. Many channels have been degraded to the point that it would be impractical to restore them to pre-disturbance conditions. Through prudent management practices, some of these channels could be stabilized; however, to be fully functional, these channels will have to undergo an evolutionary process that could take decades. In these cases, pre-disturbance conditions are no longer achievable which is an irretrievable and irreversible commitment of this resource.

●Vegetation/Wildlife Habitat Management

Sagebrush Canopy Cover

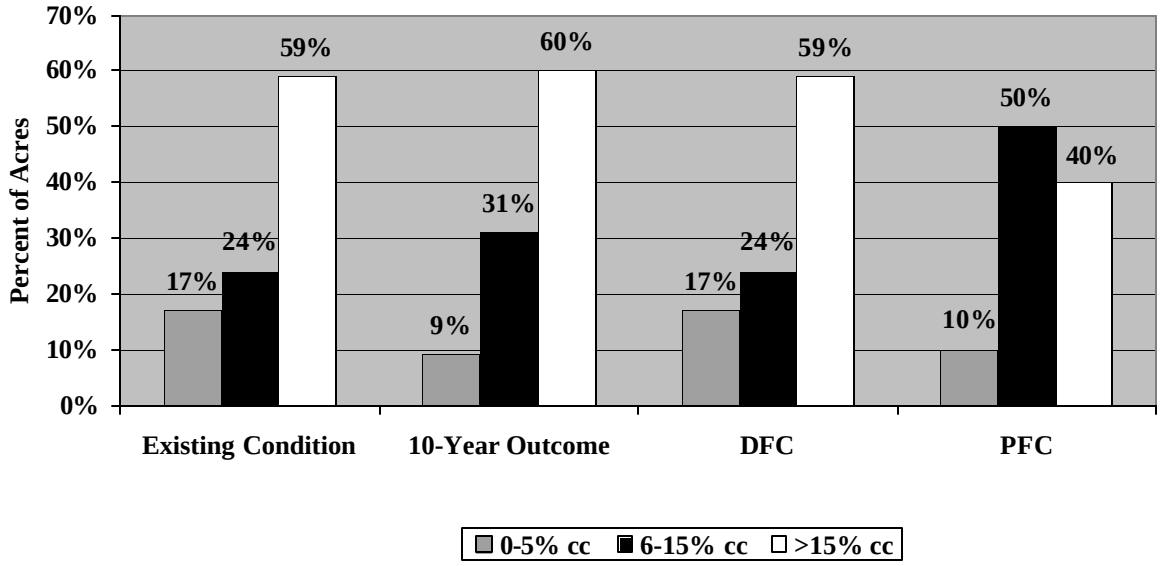
Direct and Indirect Effects:

Curlew National Grassland

Treatments and natural succession for sagebrush in this alternative emphasize priority treatments in the greater than 25 percent canopy cover using a combination of light and heavy herbicide treatments or other methods to thin canopy cover. Treatments are very similar to those proposed in Alternative F. Alternative H would reduce the number of sagebrush acres in the 0-5 percent canopy cover class by about 8 percent during the ten-year plan period. An increase of about 7 percent would occur in the number of sagebrush acres in the 6-15 percent canopy cover class. The number of sagebrush acres in the greater than 15 percent canopy cover class would increase by about 1 percent.

Figure 4.29 shows the percent of existing acres in each canopy cover class, the percent of acres in each canopy cover class at the end of the ten-year plan period, the percent of acres in each canopy cover class once the long-term goal is met. PFC criteria are presented for comparison purposes.

Figure 4.29. Alternative H
Changes in Sagebrush Canopy Cover



From Prevedel's 1997 GIS assessment and VDDT Model.

The ten-year projected outcome of natural succession and treatments proposed in this alternative would not achieve the long-term goal for sagebrush canopy cover. Future management beyond the first decade would require adjustments to treatments in all canopy cover classes to achieve the Desired Future Condition of maintaining the current existing canopy cover. Over the long term (50 to 100 years), succession and adjustments in treatments in future decades could trend the sagebrush cover type toward PFC.

The ten-year outcome results from the VDDT model show the percent of Grassland acres in each sagebrush canopy cover class in Table 4.61.

Table 4.61. Alternative H. Ten-Year VDDT Model Outcome on Sagebrush Canopy Cover Classes on the Grassland

Sagebrush Canopy Cover Class	Percent of Grassland Acres
0-5% canopy cover	9%
6-15% canopy cover	31%
16-25% canopy cover	37%
>25% canopy cover	23%

Acres of sagebrush that may be affected by wildfire events would be deducted from the total acres proposed for treatments, because of the emphasis in this alternative to maintain current levels of sagebrush acres in the greater than 15 percent canopy cover class.

The sagebrush cover type on the Grassland would not meet sagebrush PFC criteria during the ten-year plan period. Over the long term, with additional treatments in subsequent decades, sagebrush acres would trend toward the range for PFC structure, composition, and patterns. Patterns would continue to be influenced by private land practices adjacent and within the Grassland boundary.

Land management activities, such as grazing, will continue to have an influence on the rate and outcome of succession over time. Factors that have influenced succession in the past are grazing intensity, fire suppression activities, and vegetation treatments.

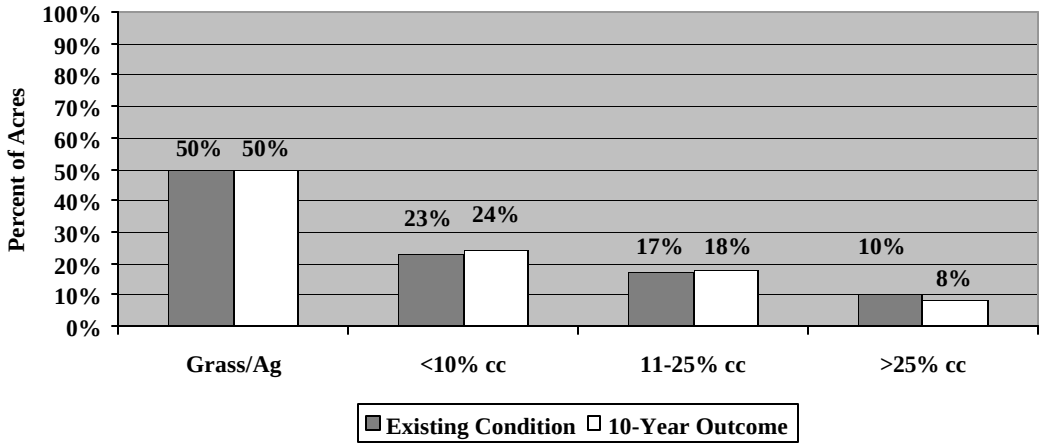
Managing Grassland resources under Alternative H would maintain the sagebrush system at a **low** magnitude of departure from the historic range of variation. This degree of departure would increase the system's resiliency and ability to recover after disturbance over the long-term.

Greater Curlew Valley Assessment Area

About 87,800 sagebrush acres in the Greater Curlew Valley Area (GCVA) are estimated to be in the greater than 15 percent canopy cover class. Treatments in this alternative would reduce the sagebrush acres in this canopy cover class to 76,000 acres, a reduction of about 15 percent. The GCVA would remain outside Properly Functioning Condition (PFC) criteria for sagebrush, because agricultural practices prevent sagebrush from reestablishing. Fire suppression would cause the sagebrush ecological type to remain outside of PFC criteria.

Figure 4.30 displays the percentage of sagebrush acres in each canopy cover class (Gardner, 1997) and compares the existing condition with the results of treatments on the Grassland during the first decade

Figure 4.30. Alternative H
Greater Curlew Valley Area
Changes in Vegetation Cover
Based on treatments on the Grassland



Estimated acres due to differences in data collection for sagebrush canopy cover classes.

Cumulative Effects:

See page 4-196.

Irretrievable/Irreversible Effects:

No irreversible or irreversible effects have been identified in this alternative.

Mountain Brush Management

Direct and Indirect Effects:

Curlew National Grassland and Greater Curlew Valley Area

This alternative does not propose any mountain brush acres for treatment. The effects will be similar to mountain brush effects discussed in Alternatives A, C, D and G.

Vegetation Understory Composition

Direct and Indirect Effects:

No prescribed fire treatments would be conducted on sagebrush acres outside of bulbous bluegrass sites. Understory vegetation would become sparser and less vigorous as sagebrush canopy cover increases. No improvement would be expected on these sites in this alternative.

Cheatgrass or other species capable of rapidly invading a disturbed site would not be disturbed in this alternative.

Herbicide applications would occur on 9,600 acres to thin sagebrush acres in greater than 15 percent canopy cover to achieve a 6-15 percent canopy cover. An increase in understory forage production would be expected in the second year following treatment. If herbicide treatments are applied on crested wheatgrass sites, understory forage production would increase on these sites as more moisture and nutrients become available. Species diversity in the understory would remain unchanged overall.

Herbicide applications on native vegetation would reduce the canopy cover somewhat by killing some of the sagebrush, allowing more moisture and nutrients to reach the existing understory vegetation. Grasses and forbs existing on the site would be expected to increase in vigor and density after treatment.

Prescribed burning, plowing and reseeding bulbous bluegrass sites with native non-native species would improve understory diversity and increase herbaceous production. If bulbous bluegrass treatment areas are adjacent to other untreated areas where the canopy cover is denser and the understory is primarily composed of non-native species, grazing overuse on restored bulbous bluegrass sites is likely to occur. As the diversity and palatability of understory species increase, grazing animals would select these sites, because they offer diversity not generally available to them. As a result, grazing animals would graze these sites heavily before returning to other less palatable vegetation. If native forbs and sagebrush were seeded with non-native grass and forb species, the native forbs might be able to compete and even reproduce within the site. Sagebrush would be expected to re-establish on the site quite fast, probably reducing the time to progress to a canopy of 10 to 25 percent in five to ten years. This estimate is based on sagebrush re-establishment rates within the Grassland (IDT Meeting Notes, September 2001).

If non-native and native grasses are mixed within one seeding, the non-natives would out-compete most of the natives. Any natives that survive would act as "ice cream" plants and be the preferred forage of livestock and wildlife. They would quickly disappear from one of two likely processes. Most directly, they would be over-grazed and dying out. Indirectly, the native grasses would be grazed first and hardest; this stress would allow the non-natives to out compete the grazed natives for water and nutrients. Sites treated with either a mixture of native and non-native grasses or native grasses that are in a field adjacent to a non-native seeding would be overused by grazing animals due to the diversity and increased palatability that native grasses offer.

Selective grazing is a major factor affecting rate, direction and magnitude of ecological succession, because the competitive abilities of individual plants are altered by frequency and severity of defoliation. If these sites are overgrazed, an invasion of annuals and other non-desirable plants could be expected. Where small, treated areas are adjacent to or intermingled with untreated bulbous bluegrass sites or crested wheatgrass sites, invasion by these the non-native species would occur as the native plants become stressed and lose vigor.

This alternative proposes a variable 20-50 percent livestock use level on uplands, depending on the needs of the vegetation, or two- to six-inch stubble height in riparian zones, and a 50 percent livestock use rate on native and non-native plants. The use level may be higher than 50 percent on plants such as crested wheatgrass that need higher use to maintain their vigor. Native sites and those important for sage grouse nesting habitat would be grazed less than 50 percent. This would result in better plant conditions than a "one size fits all" use level.

On seeded sites, the proposed livestock utilization level would be considered a low level of use. On bulbous bluegrass, vigor would improve and the plant would become more aggressive in its reproductive capabilities. Production could increase and the plant could become more competitive, actually slowing down any increase in density of the shrub layer. Crested wheatgrass would be expected to become "wolfy," especially at the 40 percent level of use. Production would drop, fuels would increase, and shrub invasion could be enhanced as vigor dropped. Increasing wolf plants would make plants less palatable, causing more use on previously grazed plants and native plants in the field. Eventually, a decrease in the capacity lower than current estimate would likely occur.

This level of use on natives would be desirable for a sustainable community. A stable or n upward trend with more desirable species would be expected. Production could slightly increase, but vigor and reproductive capacity would be expected to increase substantially, allowing the plant community to become more competitive against shrub establishment. More litter and residual cover would be available to improve watershed conditions and provide wildlife cover.

In riparian areas, the effects at this level of livestock use would be expected to be the same as those described in Alternative C.

This alternative provides an opportunity to improve understory diversity and production on 2,500 acres of existing bulbous bluegrass sites. Some increase in understory diversity and production could be expected on sagebrush acres treated with an herbicide, but not to the same extent as treatments on bulbous bluegrass sites.

Approximately 2,000 acres of bulbous bluegrass would remain untreated at the end of the ten-year plan period. These sites would continue to display a lack of diversity in the understory. Vegetation production would remain at less than 500 pounds per acre.

Cumulative Effects:

See page 4-197.

Irretrievable/Irreversible Effects:

The loss of understory diversity and forage production on bulbous bluegrass sites would be irretrievable while sites are producing below what they are biologically capable of producing. The loss of biodiversity and wildlife cover on these sites could be causing irretrievable effects that are yet to be understood and quantified.

The loss of native vegetation on non-native sites and the processes and cycles associated with it could be causing an irretrievable loss yet to be understood or quantified.

On non-native sites, changes in natural successional pathways have been altered by cultivation and other human-disturbances. The loss of natural successional pathways on these sites would be considered an irretrievable effect until native vegetation re-establishes.

Wildlife Habitat Management

Direct and Indirect Effects:

Effects on Sagebrush Habitat

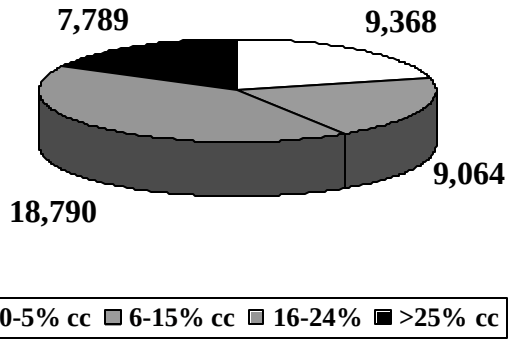
Alternative H maintains the .25-mile buffer around active sage grouse leks to prevent lek abandonment. The .25-mile lek buffer came from a guideline in the Idaho Sage grouse Management Plan (1997). While this guideline was developed to reduce lek disturbance due to roads, fences, and power lines, it has been applied to vegetation within this buffer to maintain the vegetative structure and prevent lek abandonment. This alternative does not incorporate the 3.2-mile buffer recommended in Connelly, *et al* (2000) to protect nesting habitat. This is based on the fact that the Grassland is highly fragmented, and studies in the area (Apa, 1998) found that hens may move over five miles to nest. This deviation from the Connelly 2000 guidelines has been agreed upon by area biologists from both the Forest Service and Idaho Fish and Game (10/25/01).

Table 4.62. Alternative H. Changes in Percentage of Acres in Sagebrush Canopy Cover over the Grassland and Greater Curlew Valley

Sagebrush Canopy Cover Class	Grassland % of Existing Acres	Grassland % of Acres Year 10	Greater Curlew % of Existing Acres	Greater Curlew % of Acres Year 10
0-5% cc	17%	9%	50%	50%
6-15% cc	24%	31%	23%	24%
16-24% cc	42%	37%	17%	18%
>25%	17%	23%	10%	8%

Figure 4.31 displays the existing distribution of sagebrush canopy cover classes outside the .25-mile buffer of known active lek locations using 1991 lek data.

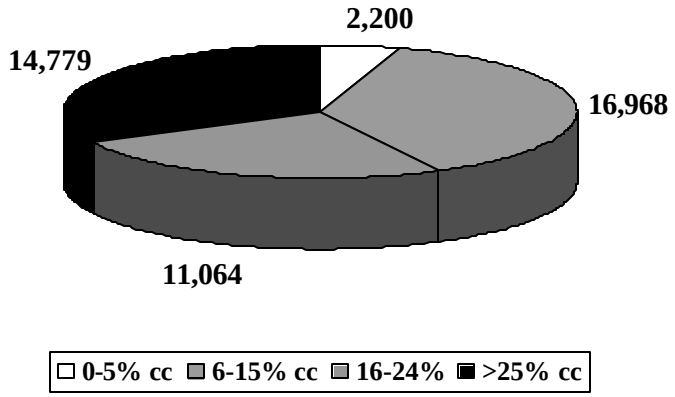
Figure 4.31. Alternative H
Existing Acres of Sagebrush Canopy
Outside .25-Mile Buffer
Year 0



Buffer zones in this alternative encompass about 5 percent of the Grassland acres. About 95 percent of the Grassland would be available for treatment outside of the buffer zones. Treatments could be distributed across the landscape rather than concentrated in a few areas. Approximately 46 percent of sagebrush acres with canopy cover greater than 15 percent would be treated outside the buffer zones. Effects on fragmentation and connectivity would be variable depending on the location or timing of the treatments. Treatments proposed could reduce the number of existing 320 acre habitat patches in greater than 15 percent canopy cover from nineteen to three. The lek buffer proposed in this alternative is smaller than those proposed in Alternative A, C and G. Only three of the habitat patches would be converted to 0-5 percent canopy cover class, and thirteen patches would covert to the 6-15 percent canopy cover class as a result of mechanical and herbicide treatments. Only three of the habitat patches would be converted to 0-5 percent canopy cover as a result of bulbous bluegrass treatments, while the mechanical and herbicide treatments would focus on areas where sagebrush canopy cover is greater than 25 percent. These treatments would move the canopy cover class back to about 15 percent. It is expected that about ten patches would be converted to the 6-15 percent canopy cover class from these thinning treatments. This will leave six patches of greater than 320 acres in the greater than 15 percent canopy cover. Fragmentation caused by the creation of early seral stands would be limited, and the thinning treatments would allow greater connectivity across the area.

Figure 4.32 displays an estimation of the results of treatments and succession on canopy cover classes in Year 10 on the acres outside of the buffer zones. The figure does not necessarily represent true on-the-ground conditions in Year 10. It is used only as a tool to show differences between the alternatives.

Figure 4.32. Alternative H
Estimated Acres of Sagebrush Canopy Cover
Outside .25-Mile Buffer
Year 10



Effects on Riparian Species

Effects would be similar to those described in Alternative C and F. Livestock utilization levels would be based on stream conditions. Effects of this management should maintain those reaches in properly functioning condition and improve those reaches that are functioning at-risk and non-functioning.

Table 4.63. Alternative H. Effects on Riparian Species

Measure	Result
Predicted changes in habitat	Nesting and foraging habitat would increase moderately above currently low levels.
How well the alternative meets conservation measures	This alternative moves towards conservation measures outlined by IPIF 2000.
Predicted changes in distribution and numbers on Grasslands	Numbers are expected to increase slightly. Distribution should improve over the Grassland, but still not moving towards the potential distribution.

Effects on Sagebrush Species (Except Sage grouse)

The distribution of sagebrush canopy cover classes at the end of the decade would increase the number of acres in the 6-15 percent and greater than 25 percent canopy cover classes, with fewer acres in the 0-5 percent and the 16-24 percent canopy cover classes.. This shift would not meet PFC criteria for the sagebrush type during the ten-year plan period. It would result in a trend toward meeting the criteria over the long-term. Treatments would result in a decrease in available habitat for those species associated with more open stands, such as the short-eared owl

and the long-billed curlew and maintain habitat for those species using more closed stands, such as the pygmy rabbit.

Sagebrush obligate species nest on the ground underneath shrubs or they nest in the shrub layer. Removal of sagebrush could reduce production for these species on treated sites, since the birds would be unable to find nest sites. However, most of the treatments proposed are herbicide or mechanical treatments, which would thin sagebrush canopy cover and retain a sagebrush overstory.

Table 4.64. Alternative H. Effects on Sagebrush Habitat and Species

Species	Effects
Short-eared owl	An 8% decrease would be expected in suitable habitat over the Grassland, and a 1% increase over the GCVA, based on sagebrush overstory. A 50% utilization level is predicted to be adequate to slightly improve habitat for voles. Populations of short-eared owls would be expected to decrease from current levels on the Grassland and stay the same or slightly increase over the GCVA.
Long-billed curlew	An 8% decrease would be expected in suitable habitat over the Grassland, and a 1% increase over the GCVA, based on sagebrush overstory. Utilization levels of 50% would result in increased cover for nesting. Populations of long-billed curlew would be expected to decrease from current levels over the Grassland and stay the same over the GCVA.
Sharp-tailed grouse	Approximately 91% of sagebrush acres would remain in greater than 5% canopy cover. Bulbous bluegrass treatments would be seeded with native and non-native seed mixes, possibly increasing understory diversity over 2,500 acres. Utilization levels of 50% may increase overhead nesting cover slightly and would be expected to improve nesting success. Populations of sharp-tailed grouse would be expected to increase over current levels.
Pygmy rabbit	A 1% increase would be expected in suitable habitat over the Grassland, and a 2% decrease over the GCVA, based on sagebrush overstory. Fragmentation could increase, with the number of sagebrush patches greater than 320 acres with sagebrush canopy cover greater than 16% dropping from 19 to 6. Ten patches would still have a sagebrush overstory because of the thinning treatments and may reduce effects of fragmentation and predation. Bulbous bluegrass treatments would be seeded with native and non-native seed mixes, possibly increasing understory diversity over 2,500 acres but would not be suitable for pygmy rabbits for 20-25 years (until sagebrush density reaches at least 15%). Populations and distribution would be expected to remain at the current levels over the Grassland and GCVA .

Effects on Sage Grouse

Guideline 1

Manage breeding habitats to support 15-25 percent canopy cover of sagebrush, perennial herbaceous cover averaging greater than 18 cm in height with greater than 15 percent canopy cover for grasses and greater than 10 percent for forbs and a diversity of forbs.

Guidelines in this alternative avoid vegetation treatments with 0.25 miles of active sage grouse leks to prevent lek abandonment.

Over the ten-year plan period, sagebrush would be managed to provide 60 percent of sagebrush acres in greater than 15 percent canopy cover with about 37 percent of the Grassland acres in the 16-24 percent canopy cover class. Approximately 2,500 acres would be treated, where bulbous bluegrass dominates the understory, using prescribed fire, plowing and reseeding with a native and /or non-native seed mix. Treated sites would not be suitable for nesting sage for twenty-five to thirty years.

Succession over the ten-year period would continue to shift existing younger stands into denser canopy classes, creating additional sage grouse habitat. Due to succession, more nesting habitat will be lost than what is being replaced from the 6-15 percent canopy cover class. The thinning treatments will treat sagebrush sties that have already moved out of the suitable nesting habitat and move them back to where they will be suitable in the next two decades.

The desired future condition defined for this alternative would result in a mosaic of sagebrush acres, where around 60 percent of the Grassland acres would be maintained in the greater than 15 percent canopy cover class. A reduction from existing conditions in nesting habitat for sage grouse would occur, but this alternative would also leave 31 percent of the Grassland acres in the 6-15 percent canopy cover class, which would become suitable nesting habitat in the second decade.

Overall, upland vegetation utilization would be established at 50 percent. Actual allowable use levels in individual pastures would be determined at the site-specific level. These levels would be higher in some areas, such as crested wheatgrass, where livestock grazing helps to maintain plant vigor. Use levels would be lower in areas important to nesting sage grouse to maintain adequate residual vegetation for hiding cover and/or native understory sites. This increase in residual vegetation height over existing conditions would improve nesting success and brood survival for sage grouse and sharp-tailed grouse and would be more beneficial for all other wildlife species.

Herbicide applications and mechanical treatments would reduce canopy cover to around15 percent. Treatments would reduce available sage grouse nesting habitat until canopy cover reaches greater densities after treatment. Decreases would be slight as treatments would be prioritized in areas of sagebrush canopy cover of greater than 25 percent where habitat suitability is already low. Some slight improvement in understory production and vigor could be expected as a result opening the canopy cover.

Baxter (1996) analyzed changes in understory diversity seventeen years after treatment of sagebrush with Tebuthiuron, an herbicide, near Albion, Idaho. He found that with decreased sagebrush canopy cover, there was a decrease in bare ground and an increase in understory plant cover and production. While treatments in Alternative H will not produce the exact same results, the trends should be similar. Increase understory plant cover and production, in combination with the utilization standards applied in this alternative, will result in improved sage grouse nesting and brood-rearing habitat on the Grassland.

Guideline 2

Adjust timing of permitted activities to minimize disturbance of breeding activities.

Proposals for travel plan changes are more restrictive in this alternative than in Alternative A and B. Motorized travel would be restricted to designated routes year-round. Restricted travel during breeding may reduce disturbance to displaying and nesting grouse and slightly increase nesting. A slight reduction in disturbance to leks and nest sites would be expected.

Guideline 3

Avoid land use practices that reduce soil moisture effectiveness, increase erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs.

Most activities, including vegetation treatments, recreation, and livestock grazing, can result in one or all of these conditions, depending on treatment, timing, slope, proximity to exotic seed sources and seed mixes used for restoration efforts. (See the Watershed Condition section under Alternative H for a discussion on the potential erosion rates, based on treatments proposed in each alternative. The Vegetation Understory section discusses changes in understory composition and structure in relationship to proposed treatments in this alternative.)

Land use practices have the potential to increase erosion and exotic plants. Bulbous bluegrass treatments on 2,500 acres should result in improved understory and water infiltration. Herbicide or mechanical treatments on 9,600 acres would open up sagebrush overstory and should result in an improvement in understory abundance and diversity of forbs. Mitigation and design features would minimize exotic or undesired plant establishment.

Guideline 4

Maintain sagebrush communities on a landscape scale, allowing sage grouse access to sagebrush stands with a canopy cover of 10-30 percent and heights of at least 25-35 cm regardless of snow cover.

Winter cover for sage grouse would be slightly reduced as sagebrush acres greater than 25 percent canopy cover are treated. However, the amount of sagebrush in the greater than 25 percent canopy cover class would increase by the end of the decade as a result of succession. This would be dependent on the site-specific location of the treatment. A reduction in winter survival of sage grouse would not be expected, as the size, location, and timing of the treatments would be analyzed at the site-specific project level to reduce effects.

Overall Compliance with Draft Sage Grouse Guidelines

Alternative H partially meets the guidelines. A slight increase would be expected in the number of sagebrush acres in the greater than 15 percent canopy cover class. Utilization rates suggest an increase in residual vegetation at the end of the grazing season. Using native and non-native

seed mixes to restore bulbous bluegrass sites could increase understory diversity. Placing motorized use on designated routes would decrease the potential for disturbance to breeding and nesting birds.

Miles of Tree Rows at the End of the Decade

Effects would be the same as those described under Alternative A.

Cumulative Effects:

See page 4-197 and 4-206.

Irretrievable and Irreversible Effects:

An irretrievable loss of sage grouse nesting habitat would occur on 7,600 acres currently in greater than 15 percent canopy cover until canopy cover reaches greater than 16 percent, generally ten years. An irretrievable loss of sage grouse nesting habitat would occur on 2,500 aces until sagebrush re-invades and reaches greater than16 percent canopy cover, generally twenty to thirty years.

An irretrievable loss of native understory on 2,500 acres for ground-nesting and ground-foraging birds could be expected on bulbous bluegrass treated sites until vegetation reestablishes, generally five years.

There are no irreversible effects to sage grouse habitat associated with the use of prescribed fire or other vegetation treatments.

●Economic and Social Values

See discussion under Alternative A beginning on page 4-39.

Livestock Grazing

Effects of livestock grazing on riparian areas, vegetation understory composition and wildlife habitat are discussed in each of these sections respectively, rather than under the livestock section.

Alternative H proposes 46,594 acres as suitable for livestock grazing. A 50 percent grassland-wide utilization level in the uplands and a range of riparian utilization levels from 20 percent to 50 percent based on a stream's properly functioning condition would be employed. Streams considered to be "at risk" would be corridor fenced and all other perennial streams would be fenced into riparian pastures using existing fences where feasible. In order to calculate head months based on these alternative components, a mid-range of 35 percent was used for riparian areas in this calculation for forage production and head months for the existing situation (Year 0) and Year 10. (See Appendix G for actual calculations.)

Direct/Indirect Effects:

Treatments in this alternative focus on maintaining the current sagebrush canopy classes over the plan period and bringing at-risk riparian areas into a properly functioning condition by corridor fencing and installing riparian pastures on all other perennial streams where they do not currently exist.

Calculations for estimated forage production indicate potential head months would range from 16,246 to 23,124 compared to 21,400 head months currently permitted.

Table 4. 65. Alternative H
Estimated Forage Production and Potential Head Months

Year	Estimated Forage[1]	Potential Head Months	Increase/Decrease (+ or -) Over Current Permitted Numbers
Year 0	**38.4 M**	**16,240 – 23,125**	**(+ or -)**
Year 10	**36.6 M**	**15,725 – 21,850**	**(+ or -)**

[1] Shown in millions of pounds and includes all vegetation – sagebrush, mountain brush and riparian.

During the ten-year plan period, forage production would decrease from about 38.4 million pounds to about 36.6 million pounds. More acres would be maintained in the greater than 15 percent canopy cover at the end of the ten-year plan period. As production falls, a slight decrease in head months from Year 0 may be necessary to maintain livestock grazing at sustainable levels.

The Grazing Allotment Management Planning (AMP) process will be conducted at the site-specific level according to the direction in the Forest Service Handbook (2209) within three years following the decision on the Grassland Plan. Utilization levels will be implemented immediately in the grazing season following the Plan decision through Annual Operating Instructions. Actual use may be lower than permitted numbers in order to meet the allowable use levels prescribed in the Grassland Plan. Allowable use levels will be determined on a yearly basis based on Key area use monitoring during the grazing season.

Over the long-term if vegetation treatments were to continue, forage production would increase as desired sagebrush canopy covers were achieved. More acres would be in the higher production canopy cover types, generally 0-5 percent and 6-15 percent, with fewer acres in the greater than15 percent canopy cover class. Any additional forage would be available to meet resource management objectives at that time.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

Utilization levels and treatments proposed in this alternative would result in a decrease in grazing head months at the end of the ten-year plan period. This decrease would be an irretrievable loss.

An average of 1,400 acres would be unavailable for livestock grazing beginning in year five of the ten-year plan period. The loss of head months as a result of treatments would be an irretrievable loss during treatment periods or until grazing resumes.

Herbicide treatments on the proposed 9,600 acres would not affect livestock grazing. Grazing would continue while the acres are being treated. No irretrievable loss would occur on these areas.

No irreversible effects have been identified for this alternative.

Air Quality/Visibility Analysis

Indicator used to measure effects between alternatives: Number of acres treated with prescribed fire and tons of PM_{10} and $PM_{2.5}$ emitted on an annual basis.

Scope and Scale of Analysis:

Because of the concern for the effects the Grassland Land and Resource Management Plan could have on air quality and visibility, a comprehensive air quality analysis is provided for the Final Environmental Impact Statement (EIS). Results in the Draft EIS may differ from the results shown below because of differences in analysis methods and use of different models.

This analysis considers the effects each alternative may have on air quality/visibility for the Curlew National Grassland, the Greater Curlew Valley Area, and Class I airsheds within 200 kilometers of the Grassland. Holbrook, Idaho and Snowville, Utah are local communities that may be affected by adverse air quality and visibility from prescribed fire treatments. Air quality and visibility are affected by meteorological condition, time of season, and amount of acres treated with prescribed fire.

Smoke/visibility effects were analyzed using the First Order Fire Effects Model (FOFEM) and the Simple Approach Smoke Estimate Model (SASEM). The data generated from these models were calculated by using an average fuel loading of 4.5 tons of brush per acre because most prescribed fire would occur on greater than 15 percent sagebrush canopy cover. The average production of emissions by burning sagebrush vegetation types was calculated to be 111.4 pounds per acre of PM_{10} and 94.5 pounds per acres of $PM_{2.5}$. In the data presented, $PM_{2.5}$ is considered part of the PM_{10} total and is not additional (D.Haddow, 2001). Modeling analysis information presented in this section is intended and designed to indicate relative differences among alternatives, rather that to predict absolute amounts of outputs and effects. The actual amount and timing of acres treated with prescribed fire in each Alternative will likely vary from the assumptions used in this analysis. The average annual amount of acres to be burned was used to calculate emissions in each alternative rather than the decadal amount.

The principle law that governs air quality is the Clean Air Act of 1970 as amended in 1990 and 1999. Other laws including state laws, regulations, and policies affect air quality management on the Curlew National Grassland. National laws and regulations have also been interpreted for implementation in the Forest Service Manuals, Handbooks, and Regional Guides. Air quality goals, standards and guidelines have been designed in the Plan to achieve desired air resource and visibility conditions over the short- and long-term. Standards and guidelines have also been designed to protect air quality, as well as other resources that could be adversely affected by air pollution.

Effects common to all action alternatives

All prescribed fire treatments must follow an approved burn plan and meet specific conditions that will not adversely affect air quality. All prescribed burning will follow the Montana/Idaho Smoke Management Plan, and the Idaho State Implementation Plan. Smoke generated by prescribed fire treatments has the potential to adversely affect visibility and public health. Smoke management techniques, such as timing and location of prescribed fires and favorable conditions for smoke dispersal, help to reduce adverse effects. Information about fuel conditions, meteorological conditions, air movement patterns, and timing and duration of prescribed fires are

used to reduce effects. All alternatives are expected to meet air quality standards by following all federal, state and local regulations, and by meeting standards and guidelines in the Curlew National Grassland Land and Resource Management Plan.

Prescribed burning presents the combined hazards and risks of fire and smoke to ground crews involved with burning operations on site. Effects on workers may include eye irritation, coughing and shortness of breath in moderate-to-heavy smoke concentrations. Workers trapped in an area of heavy smoke may be asphyxiated. Heavy smoke may also endanger members of the public in adjacent areas such as Holbrook, Idaho and Snowville, Utah for short periods. Visibility may be impaired on some roadways during burning operations and contribute to deteriorated visibility in the area for short periods.

Class I areas within 200 kilometers of the Curlew National Grassland include the Craters of the Moon National Monument near Arco, Idaho, and the Jarbidge Wilderness Area in Northern Nevada. Treatments using prescribed fire on the Grassland will be conducted only when it is assured that visibility and air quality in these Class I areas will not be impaired.

Carbon exchange and sequestration that may affect global warming occur under all alternatives through natural successional and disturbance processes as well as managed vegetation treatments such as prescribed fire and grazing. Though these carbon balances are affected and likely vary by alternative, the means to estimate the expected changes by alternative are not currently available at this scale analysis.

Alternative A

Direct/Indirect Effects:

Alternative A proposes to treat 18,750 rangeland acres using prescribed fire over a ten-year period. This alternative will create the greatest potential effects on air quality and visibility for the Grassland and the Curlew Valley (mainly from smoke and dust - PM_{10} and $PM_{2.5}$) of all the alternatives.

Approximately 1,875 acres would be treated on an average, annual basis. This alternative would produce approximately 104.4 tons of PM_{10}, of which approximately 88.6 tons would be $PM_{2.5,}$ on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans would result in no adverse long-term effects as a result of the treatments proposed in this alternative.

Primarily, smoke and dust (PM_{10} and $PM_{2.5}$) would be the released air pollutants. No Class I areas will be affected in this alternative when following regulations.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative B

Direct/Indirect Effects:

Alternative B proposes to treat 5,850 acres using prescribed fire over a ten-year period. Approximately 585 acres would be treated on an average, annual basis. This alternative would produce approximately 36.6 tons of $PM_{10,}$ of which approximately 27.6 tons would be $PM_{2.5,}$ on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans should result in no adverse long-term effects as a result of the treatments proposed in this alternative.

Primarily, smoke and dust (PM_{10} and $PM_{2.5}$) would be the released air pollutants. No Class I areas would be affected in this alternative when following regulations.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative C

Direct/Indirect Effects:

Alternative C proposes to treat 1,500 acres with prescribed fire over a ten-year period. About 150 acres would be treated on an average, annual basis. This alternative would produce approximately 8.3 tons of $PM_{10,}$ of which approximately 7.1 tons would be $PM_{2.5,}$ on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans would result in no adverse long-term effects.

Primarily, smoke and dust (PM_{10} and $PM_{2.5}$) would be the released air pollutants. No Class I areas will be affected in this alternative.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative D

Direct/Indirect Effects:

Alternative D proposes no specific prescribed fire treatments. If required, prescribed fire would be used only to improve habitats to maintain viable populations of wildlife. No estimate for smoke production is available at this time. This alternative is expected to have the least effects on air quality/visibility of all the alternatives.

No Class I areas will be affected in this alternative.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative E

Direct/Indirect Effects:

Alternative E treats 10,200 acres with prescribed fire over a ten-year period. Approximately 1,020 rangeland acres would be treated on an average, annual basis. This alternative would produce approximately 56.8 tons of $PM_{10,}$ of which approximately 48.2 tons would be $PM_{2.5}$, on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans would result in no adverse long-term effects.

Primarily, smoke and dust (PM_{10} and $PM_{2.5}$) would be the released air pollutants. No Class I areas will be affected in this alternative.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative F

Direct/Indirect Effects:

Alternative F proposes to treat 2,700 rangeland acres with prescribed fire over a ten-year period. Approximately 270 rangeland acres would be treated on an average, annual basis. This alternative would produce approximately 15.0 tons of PM_{10}, of which approximately 12.7 tons would be $PM_{2.5}$, on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans would

result in no adverse long-term effects.

Primarily, smoke and dust (PM_{10} and $PM_{2.5}$) would be the released air pollutants. No Class I areas will be affected in this alternative.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative.

Alternative G and H

Direct and Indirect Effects:

Alternatives G and H propose to treat 2,500 rangeland acres with prescribed fire over a ten-year period. Approximately 250 acres would be treated on an average, annual basis. Alternative H is more adaptive and may use more prescribed fire based on needs determined in project level analysis. The alternative would produce approximately 13.9 tons of PM_{10}, of which approximately 11.8 tons would be $PM_{2.5}$, on an annual basis. These releases may create short-term adverse effects on air quality and visibility. Compliance with mitigation measures and smoke management plans would result in no adverse long-term effects.

Primarily, smoke and dust (PM_{10}) would be the released air pollutants. No Class I areas will be affected in this alternative.

Cumulative Effects:

See page 4-194.

Irreversible/Irretrievable Effects:

No irreversible or irretrievable air quality/visibility effects have been identified in this alternative. Table 4.66 summarizes the amount of emissions of PM_{10} and $PM_{2.5}$ produced from each alternative.

Table 4.66. Summary of Emissions Produced from Smoke by Alternative

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F	Alt. G	Alt. H
Acres Burned Annually	**1,875**	**585**	**150**	**0**	**1,020**	**270**	**250**	**250**
PM10 Produced (tons)	**104.4**	**32.6**	**8.3**	**0**	**56.8**	**15.0**	**13.9**	**13.9**
PM2.5 Produced (tons)	**88.6**	**27.6**	**7.1**	**0**	**48.2**	**12.7**	**11.8**	**11.8**
Total PM Produced	**104.4**	**32.6**	**8.3**	**0**	**56.8**	**15**	**13.9**	**13.9**

Developed and Dispersed Recreation

Direct and Indirect Effects:

Developed campground use on the Grassland will continue at the present rate under all alternatives. Changes in travel management, grazing, and vegetation treatments are unlikely to have a discernable effect on the demand for developed camping on the Grassland.

Hunting upland birds, rabbits, waterfowl and deer are popular pursuits on the Grassland. Bird watching grows in popularity annually. Assuming no changes in current hunting regulations, wildlife dependent dispersed use will follow the ups and downs of wildlife populations.

Alternatives A (No Action) and E

If sage grouse habitat declines, it is likely grouse populations would decline along with hunting and bird watching of the grouse. This would be a secondary effect of sage grouse habitat loss.

Alternatives B, C, D, F, G and H:

If sage grouse habitat increases or stays static, populations improve or stay static, hunting and bird watching of the grouse could improve, and or stay static. This would be an indirect effect of sage grouse habitat maintenance or improvement.

Alternative B, and C, and G:

Creating an additional pond to the two ponds at Sweeten would enhance the site for wildlife viewing. These actions will provide more opportunity to view waterfowl and other wildlife attracted to the open water and wetlands.

For all alternatives, there would be no irreversible or irretrievable effects to developed or dispersed recreation.

Reserves/Preserves

Direct and Indirect Effects:

Alternatives A, B, C, E, F and H

These alternatives allow livestock grazing on a large percentage of the Grassland. Sweeten Pond will not have livestock grazing within its 280 acres. Even though the ponds are water impoundments maintained by a well and pump, they will be managed for wildlife habitat and natural occurring vegetation. These alternatives offer 280 acres as a "reserve" setting.

Alternative D

Alternative D eliminates livestock grazing on the Grassland. Most acres will be managed for wildlife habitat and natural occurring vegetation. This alternative would offer approximately 47,600 acres as a "reserve" setting. Wildlife viewing on the Grassland could increase due to this change in management emphasis.

Travel and Scenery

Most OHV use on the Grassland occurs on designated roads. Only a small percentage of the total recreation OHV use on the Grassland occurs cross-country. Presently, designated roads access the general areas where most recreation activities take place.

Effects Common to all Alternatives:

No recreation activities will be eliminated by any of the alternatives. OHV use would still continue on designed roads under all alternatives.

Direct and Indirect Effects:

Alternatives A, B, and E:

Under these alternatives cross-country travel is permitted from Dec. 1 to Aug 31. Typically, most of the Grassland is covered with snow from Dec 1 to March 31. This makes cross-country travel on an OHV difficult. The snow-free season begins around the end of March. Usually, cross-country travel by OHV is feasible from March 31 to Aug 31, and allowed by the Travel Plan. This use is creating new travel ways, often within riparian areas and across sage grouse habitat.

Grassland settings are "natural appearing" or rural in nature. Disturbance of the natural appearing landscape by multiple user-created roads will continue to have an effect on visitors who find the disturbance unsightly, reducing the visual enjoyment of their public lands. Depending on location and management area objectives, additional user-created routes by people traveling cross-country will not meet land management objectives for scenic values, water quality, and habitat protection.

Monitoring has indicated that most noxious weed invasions on the Grassland are occurring along system and user-created roads. Cross-country travel will likely continue to spread of noxious weeds.

Alternatives C, D, F, G and H:

Under these alternatives, all vehicular travel is restricted to designated routes year round. The effects of this alternative will not eliminate recreation activities, but will influence some aspects of various recreation activities. For OHV users, this alternative will eliminate recreation experiences associated with cross-country travel. It will limit driving to a camp spot further than 300 feet off an existing road or trail. Some people may view these changes as a loss of recreation opportunity. Most of the Grassland would still be accessible under these alternatives. Designated roads lead to most areas of interest.

Disturbance of the natural appearing landscape from "casual use" travel ways created from past use, will continue to have an negative effect on visitors who find the disturbance unsightly and objectionable. Additional disturbance caused by motorized cross-country travel will be eliminated. Over time, or through restoration, some travel ways will "heal" and not be visually apparent. Existing user-created routes that are not meeting land management objectives for scenic values, water quality, and habitat protection can be closed and/or obliterated, after appropriate analysis.

Monitoring has indicated that most noxious weed invasions are occurring along system and user-created roads. Eliminating travel on user-created roads should decrease the spread of noxious weeds.

The alternatives will not affect access by people with disabilities to public land, as the designated routes provide access to many sites and areas. The greatest impact would be the loss of opportunity to drive cross-country.

Cumulative Effects:

See page 4-208.

Irretrievable/Irreversible Effects:

For all alternatives, there would be no irreversible or irretrievable effects to travel and scenery.

Cumulative Effects

Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions." (40 CFR 1508.7). Cumulative effects must be evaluated along with direct and indirect effects of each alternative. Generally, cumulative effects are considered on a larger scale than the direct and indirect effects. They describe a larger picture across a longer time frame. When analyzing cumulative effects, different temporal and geographic scales are used than for direct and indirect effects. These scales of analysis extend only to where effects can actually be measured (EPA 1997).

In the case of Forest and Grassland planning, the effects analysis "should consider trends and sustainability in the long term while direct impacts are considered less" (EPA Letter, April 6, 2001). In this Grassland EIS, many of the direct and indirect effects are, in fact, cumulative effects due to the large scale and long time frame. For instance, watershed and riparian effects include impacts and activities on private, state, and BLM lands. Those effects and outcomes are disclosed decades into the future. The vegetation and wildlife sections discuss changes, not only on the Grassland, but also in the Greater Curlew Valley. Changes from wildfire, succession, and other activities are displayed over several temporal scales, up to 100 years in the future. Thus, the previous effects analysis has generally considered past, present and reasonably foreseeable actions across administrative boundaries. Most often, effects are analyzed at two scales: The Greater Curlew Valley and the 47,600-acre portion of the Curlew National Grassland under Forest Service administration. Where the previous direct and indirect effects analysis does not adequately disclose cumulative effects, we have augmented that in this section. Cumulative effects are discussed only for those resources impacted by these alternatives.

Cumulative effects analysis involves assumptions and uncertainties. Cumulative effects analysis provides the opportunity to evaluate future Grassland management options in the context of other developments in the analysis area.

The Curlew Amendment ID Team identified the past, present, and reasonably foreseeable future actions within the analysis area. Chapter 3, Affected Environment, provides more specific information regarding many of the actions shown below.

Past Actions

Natural Actions

Natural fires have occurred over time within the analysis area.

Flash flooding during severe rain events has been common in some areas.

Noxious weed invasion, carried by wind, humans and animals has occurred.

Drought cycles, most notably in the 1930's and early 1990's have occurred.

Human Actions

During the 1940's the Soil Conservation Service completed revegetation treatments, using introduced species, to stabilize watershed conditions and values after the great dust bowl of the 1930's.

Most of the land in the analysis area has been cultivated (plowed).

Grass seed harvest occurred in the area until the 1960's.

Prescribed fire treatments have occurred.

Hunting, particularly for upland game birds, has and continues to occur in the area.

Most of the area, not under agricultural crop production, has been grazed by domestic livestock.

Present Activities

Natural Actions

As recent as the mid 1990's, elk have begun to appear in the analysis area.

Severe rain events continue to cause flash flooding and down-scouring of stream channels and riparian areas.

Human Actions

About 5,500 acres of private land are currently in the Conservation Reserve Program (CRP). Generally these lands remain in CRP for ten years. During the ten-year plan period some of these acres could come out of CRP and move back into agricultural production or other agricultural lands could move out of production into the CRP program.

Livestock grazing continues to occur. Two grazing associations are established. Some recent range improvements, including riparian fencing, have reduced grazing pressure in some areas.

Agricultural crop production continues on much of the private land in the area and adjacent to the Grassland.

Recreation, including ATVs, snowmobiles, hunting, camping, and wildlife viewing, are available and will continue to grow as the population grows.

A moratorium on the use of prescribed fire on BLM lands is in effect in the area.

All wildfires are being suppressed because of the risk to human safety and private property.

Treatments of bulbous bluegrass and reseeding are occurring. The most recent treatment was completed in 1999 on the North Carter field.

Several important archeological sites have been discovered, and archeologists and other interested individuals, locally, regionally and nationally, have participated in the Passport-In-Time program to document and protect these sites.

Water developments and water diversions are in place.

Oneida County currently has a deep well moratorium in place. It is unlikely the moratorium will be lifted during the ten-year plan period.

Oneida County is currently developing landfills in the area.

Declining populations of sage grouse in the West have resulted in Idaho Fish & Game establishing hunting limits on these species in southeast Idaho.

A local working group on sage grouse management has been established by Idaho Fish & Game. The group is made up of interested stakeholders, including ranchers, sportsmen, research scientists, local, state, and federal agencies.

Trapping and transplanting sharp-tailed grouse to other areas by Idaho Fish & Game is on-going.

A Cooperative Weed Management Group has been established for a five-county area in southeast Idaho, including Oneida County.

Land exchanges are occurring to consolidate land bases and facilitate management

Reasonably Foreseeable Actions

Human Actions

Coordination with the Shoshone-Bannock Tribe will continue to insure land management decisions and activities do not affect treaty rights.

Malad City will continue to grow as the Wasatch front expands north.

Agricultural crop production on private land in the area will most likely continue.

It is projected some private land will remain or go into the CRP program.

BLM has not proposed any vegetation management activities in the area. The agency is in the process of updating individual allotment management plans that may include such improvements as water developments and fencing. Any changes to allotment management plans could come on line in the next three to five years.

The BLM resource management plan for the area should be updated in the next ten years.

Natural Resource Conservation Service will likely continue installing catchment basins on private lands.

State of Idaho Department of Environmental Quality will establish TMDLs for all 303(d) water quality limited streams within the next five to ten years.

More water developments will be installed for livestock management.

A potential listing under the Endangered Species Act for sage grouse, sharp-tailed grouse or other sagebrush obligates may occur within the ten-year plan period if populations continue to decline.

It is likely that trapping and transplanting of sharp-tailed grouse would continue under a recovery plan.

Recent court decisions in the Ninth Circuit Court regarding the Department of the Interior, BLM, livestock grazing reforms may affect livestock grazers who hold BLM permits.

An increase in the use of developed sites and campgrounds is likely as the population increases. OHV use is likely to increase due to BLM/FS overall travel plan changes with road closures, etc.

More interpretive sites will likely be developed during the ten-year plan period.

Archeological digs and activities will continue.

Noxious weed abatement efforts will increase.

Air Quality/Visibility

Cumulative effects on air quality/visibility for past, present and foreseeable future activities on the Grassland have been analyzed for the Alternatives. Past and present effects on air quality include smoke from prescribed fire, wildfires, dust from agricultural practices, and travel on native surfaced roads. The Grassland is currently unclassified for National Ambient Air Quality Standards but is considered and Class II area. Prescribed fire, wildfire and agricultural practices are expected to continue into the foreseeable future. Additional PM_{10}, $PM_{2.5}$ and carbon monoxide created from prescribed fire in each alternative are not expected to exceed National Ambient Air Quality Standards when complying with the Montana/Idaho Smoke Management plan, the EPA Interim Policy and following prescribed mitigation measures in the Plan. Burning will be permitted only when management-caused smoke emissions combined with other residual pollutants does not create cumulative effects. Appropriate planning and authorization will be conducted prior to burning operations. Alternative A, the alternative with the most prescribed burning proposed, showed no violations in PM_{10} standards when providing for a minimum of approximately 200 meters in plume rise or mixing height. All other alternatives were within

standards using the same variables.

On occasion, smoke produced from wildfires added to existing emissions from industrial, agricultural, and automobile pollution could create cumulative effects that may result in adverse conditions for public health. These conditions may also result in non-attainment of the PM_{10} and $PM_{2.5}$ standards in impacted areas such as Pocatello and Chubbuck, Idaho. No other cumulative effects have been identified from the proposed action and alternatives to the proposed action.

The affects each alternative would have on global change were also considered in the cumulative effects analysis. Because no methods for analysis are available at this scale, conclusions on cumulative effects would be subjective and speculative. However, the effects from the release of greenhouse gasses by managed prescribed fires are expected to be less than effects from uncontrolled wildfires.

Watershed

Watersheds throughout the Curlew Valley and surrounding area have been heavily impacted by agricultural and livestock grazing activities. Most of the lands within the valley have been farmed at one time on another, and vegetation has been type-converted from a sagebrush-step type to grass and agricultural fields. This has altered the runoff characteristics of the watersheds, which have adversely affected the channel network throughout the area (Kohnke, 1968; Branson, *et al*. 1981). Many channels throughout the Curlew Valley have downcut, reducing the potential extent of riparian zones, reducing potential water quality and diminishing the potential quality and quantity of aquatic habitat.

Agricultural return flows have also degraded surface and ground water quality by adding sediment, nutrients and pesticides to the system (Bolke, 1969; Baker 1974). In some areas bacterial levels are elevated from livestock wastes (Idaho DWR, 2000). Some stream channels have substantially altered flows because of diversions for irrigation and increased runoff from agricultural fields (Bolke, 1969; Baker, 1974; Kohnke, 1968). Some of these diversions take most, if not all, surface flows for a large portion of the year. Altered flow regimes affect potential channel stability, water quality and aquatic habitat. All these effects (farming, grazing, diversions, etc.) have combined to reduce the potential function of the area's watersheds and the quality and quantity of stream flows (Bolke, 1969; Baker, 1974; USGS, 1970).

These effects are expected to persist into the foreseeable future. The Grassland occupies only a small portion of the Rock Creek and Deep Creek watersheds. Even if all watersheds within the Grassland boundary were elevated to an "excellent" condition, the overall condition for the entire watersheds as a whole would not substantially improve because of the influence of these other activities throughout the entire area.

Riparian

Past and present livestock grazing and agricultural activities throughout the Curlew Valley and surrounding area have altered the condition and function of the watersheds and stream channels. Many channels throughout the Valley, including those within the Grassland, have altered flows or have been downcut. Altered flow regimes can range from substantially reduced flows, which

reduces the amount of water available to riparian vegetation, to extreme flooding, which can scour stream banks and riparian vegetation. When channels downcut, associated water tables also tend to lower with the channel. This reduces the amount and extent of near-surface water that is needed to support riparian and wetland vegetation.

As water tables drop below the rooting zones of riparian vegetation, the extent and vigor of the riparian vegetation is diminished. In some locations, riparian vegetation has been reduced from large areas on both sides of a channel to only a few inches directly adjacent to the edge of the water.

Livestock grazing on the Grassland can be associated with the problem in many areas. Channels and associated riparian vegetation can be protected and improved within the Grassland, but outside influences from lands adjacent to the Grassland, particularly altered flow regimes and sediment loading, are beyond the control of management. Riparian vegetation is often more succulent than upland vegetation and is usually preferred by livestock. As a result, riparian vegetation is often over utilized, which can reduce the species composition, density and vigor of riparian vegetation.

Some channels have been downcut sufficiently where they must undergo an evolutionary process to restablize, usually at a lower base level. This reduces the potential extent of associated riparian vegetation. Influences from outside adjacent land use, such as farming and grazing, are expected to continue into the foreseeable future, which will reduce the potential quantity, quality, and composition of riparian vegetation throughout the area.

Sagebrush Canopy Cover

If farming and ranching practices on private land continue into the future, vegetation treatments on the Grassland would have a small effect on the overall sagebrush canopy cover in the Greater Curlew Valley Area in alternatives A and E, because these alternatives treat the most acres with prescribed fire. These treatments are expected to reduce the sagebrush canopy cover to 0-5 percent on these acres. However, when compared with the overall number of sagebrush acres in the Greater Curlew Valley Area, the proportion is small. The Grassland represents only 9 percent of the total 524,000-acre Greater Curlew Valley.

The BLM administers approximately 240,000 acres adjacent to the Grassland. Currently a burning moratorium in is effect. It is unlikely any of the acres under BLM administration will be treated in the foreseeable future.

Approximately 5,500 acres of private farmland is currently in the Conservation Reserve Program (CRP). These acres would continue to develop under natural conditions, based on existing vegetation. As these acres come out of the CRP, agricultural practices could resume. Some uncertainty exists as to the future of the Conservation Reserve Program at this time. If the program is funded, additional acres could be placed in the program over time.

Overall treatments from managing sagebrush on the Grassland in all alternatives would not have any cumulative effect on sagebrush canopy cover, because of the rapid rate of succession and the relatively small area affected by treatments when compared to the Greater Curlew Valley Area.

Mountain Brush Management

If farming and ranching practices on private land continue into the future, limited mountain brush treatments on the Grassland in Alternatives B, E, and F would have a small effect on the overall mountain brush communities in the Greater Curlew Valley Area. The Grassland represents only 9 percent of the total 524,000-acre Greater Curlew Valley.

The BLM administers approximately 240,000 acres adjacent to the Grassland. Currently a burning moratorium is in effect. It is unlikely any of these acres under BLM administration will be treated in the foreseeable future.

Approximately 5,500 acres of private farmland is currently in the Conservation Reserve Program (CRP). These acres would continue to develop under natural conditions, based on existing vegetation. As these acres come out of the CRP, agricultural practices could resume. Some uncertainty exists as to the future of the Conservation Reserve Program at this time. If the program is funded, additional acres could be placed in the program over time.

Overall treatments from managing mountain brush on the Grassland in all alternatives would not have any cumulative effect, because of the rapid rate of succession and the relatively small area affected by treatments when compared to the Greater Curlew Valley Area.

Vegetation Understory

No bulbous bluegrass sites are known to occur outside the Grassland. No cumulative effects have been identified.

Wildlife Habitat Management

Effects common to all alternatives

Several ongoing and future activities have the potential to affect sagebrush and riparian habitats or associated species. For sage grouse these include hunting, wildlife viewing, and research activities. Declining populations of sage grouse in the west have resulted in Idaho Department of Fish and Game reducing the harvest levels in southeast Idaho. At the present time, disturbance during breeding is not known to be a problem on the Grasslands. Peak of lek activity occurs in the early morning hours, before most activities occur. Wildlife viewing has been an increasing activity on the Grasslands. In March and April of 1997, over 150 people spent two to four hours watching the birds on their leks. Bird-watchers have not had any apparent effect on lek use (K.Timothy, USFS Wildlife Biologist, pers. comm.). Current research and monitoring activities on the Grasslands are also not thought to be affecting lek use at the current time (J. Connelly, D. Meints, IDFG, pers. comm.).

Efforts to control Mormon crickets or grasshoppers may be proposed in the future. They are native insects and provide a prey base for many species, such as the sage thrasher. In the past, control efforts have used carbaryl bait. Any future control activities have to be requested by the Forest Service and would require a current NEPA decision and would be conducted in compliance with current APHIS guidance.

Additionally, cumulative effects must consider management practices on lands adjacent to the Grassland and past treatments both on and off of the Grassland. Sagebrush habitats over the Greater Curlew Valley are highly fragmented, due to differences in ownership and management Approximately 71 percent (373,628 acres) of the Greater Curlew Valley Assessment Area (GCVAA) is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that are not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to provide suitable nesting habitat. BLM currently has a ban on prescribed burning on their portion of the Grasslands. With these acres unavailable to sage grouse, any additional acres taken out on the Grassland will compound the problem of insufficient habitat. These acres will provide habitat for those species associated with open sagebrush stands, such as short-eared owl and the long-billed curlew. It is assumed that future activities on adjacent lands will favor creation of more grass/forbs/agricultural lands and open canopied sagebrush stands. Species using these types should have adequate habitat available over the long term.

Thirty-nine percent of the Grassland may provide sage grouse nesting/brooding habitat based on sagebrush canopy cover. Only about 16 percent of the Greater Curlew Valley provides nesting brooding habitat. As a result, 22 percent of the breeding habitat in the Greater Curlew Valley is on the Grassland, which only represents 9 percent of the land base. This indicates that the breeding habitats on the Grassland are very important in maintaining breeding habitats over the Greater Curlew Valley over the long term. These areas are also important for other species using denser sagebrush canopy covers, such as the pygmy rabbit.

Much of the private land within the proclaimed Grassland boundary (approximately 27,400 acres) has been converted to agricultural production or treated to improve forage for livestock. Either condition results in sagebrush canopy cover being eliminated or greatly reduced below the optimal level of greater than 15 percent. Most of these acres may never been allowed to return to pre-treatment conditions. Acres currently enrolled in CRP have not reached the desired greater 15 percent canopy cover and will not do so for five to twenty years. These acres are unavailable to sage grouse for nesting.

One of the sage grouse guidelines has been used for cumulative effects analysis. “In areas of large-scale breeding habitat loss (applies to Greater Curlew Valley), prevent additional loss or degradation.” Restoration includes following guidelines: (1) herbicide treatments should be on an experimental basis until research shows that there are no long-lasting negative effects, (2) do not treat more than 20 percent of breeding habitat over a twenty-year period, and (3) where sagebrush overstory is intact but understory is limiting, use techniques that retain some sagebrush while encouraging forbs and grass production (i.e., herbicides).

Table 4.67. Cumulative Effects for Sage Grouse (Restoration Guidelines)

Alternative	Acres of Herbicide	% breeding Habitat Treated in 10 yrs	% of all treatments that Retain Sagebrush Overstory
A	0	100%	0
B	0	24%	0
C	2,500	8%	63%
D	NA	NA	NA
E	7,000	52%	41%
F	9,600	12%	97%
G	2,500	13%	50%
H	9,600 (herbicide and mechanical)	12%	97%

Water developments are not detailed in the alternatives but can be expected to increase in the future to reduce effects on riparian habitats. Guidelines in the Forest Plan will ensure that these developments are constructed to reduce effects on riparian habitats and associated species. Some of the developments may benefit riparian-associated species; excluding livestock from the spring area will leave vegetation adjacent to the spring. This will then provide cover and foraging habitat for species like sage grouse, which use these areas for brood-rearing.

Activities on adjacent private lands have the potential to affect the quantity and quality of water reaching the Grassland riparian zones. This will then affect the rates at which vegetation like willow can become reestablished. There is no data available on the PFC status of riparian areas over the Greater Curlew Valley, but they probably show a similar distribution as on the Grasslands. Other activities on the Grasslands that may affect riparian habitats are limited largely to recreation. Developed and dispersed campsites are often located adjacent to riparian habitats. Use by recreationists for fishing, swimming etc can result in the loss or trampling of vegetation on the streambanks. Other recreational activities such as off-road OHV use can result in areas of bare ground and trampled vegetation. These effects reduce the suitability for nesting as cover, and foraging habitat is lost.

The current condition of riparian habitats over the GCVA is unknown. On the miles of inventoried streams on federally managed lands (including BLM) in the GCVA, 14 percent are in Properly Functioning Condition, 49 percent are Functioning-at-risk and 37 percent are non-functioning. Outside influences from farming and grazing are expected to continue into the foreseeable future, affecting the quantity, distribution and structure of willow riparian habitats.

The sage grouse population trend analysis (Appendix I) considered several factors that could affect sage grouse population in the GCVA. Several of these will remain constant regardless of which alternative is selected. These are (1) areas of agriculture, ranches etc; (2) reservoirs and recreational developments and associated loss of habitat; (3) amount of high-speed roads and potential for roadkill; (4) amount of power lines and associated habitat fragmentation; (5) wildfires; and (6) weather/drought.

Other factors that may vary by alternative include (1) amount of fences and associated chance for collision and predation; (2) amount of tree rows and associated increase in risk of predation; (3)

changes in habitat including sagebrush canopy cover, understory diversity for pre-laying hen and brood foraging habitat, and residual vegetation to provide cover for nests and chicks, and riparian brood-rearing habitat. All of these factors combined affect the overall suitability of habitat and sage grouse numbers. Habitat suitability affects numbers lost to predation and overall numbers influence hunting regulations set by the State.

Table 4.68. Factors potentially affecting sage grouse habitat and numbers on Grassland

AT END OF 10-YEARS	FENCES	TREE ROWS	SAGE CC >15%	UNDERSTORY DIVERSITY	RESIDUAL COVER	RIPARIAN BROOD-REARING
ALT. A	300	21	46% (-13%)	No change	No change	No change
ALT. B	300	21	68% (+9%)	No change	Improved	Improved
ALT. C	300	31	79% (+20%)	Improved on 1,500 acres	Improved	Improved
ALT. D	300	31	79% (+20%)	No change but available due to lack of grazing	Improved	Improved
ALT. E	300	21	51% (-8%)	No change	No change	No change
ALT. F	300	21	60% (+1%)	Improved on 2,500 acres	Improved	Improved
ALT. G	328	21	71% (+11%)	Improved on 1,250 acres	Improved	Improved
ALT. H	310	21	60% (+1%)	Improved on 1,250 acres	Improved	Improved

Alternative A

The combination of the above future activities over the GCVA and on the CNG has a high probability of reducing populations of sage grouse and other sagebrush associated species by significantly reducing the quality and quantity of nesting and brood rearing habitat. The increase in the diversity of the successional stages will benefit other game and non-game birds. Sharp-tailed grouse will not be affected much since they are not as dependent on higher sagebrush canopy classes. However, if Conservation Reserve Program (CRP) acres are no longer available, the loss of open canopied sagebrush dominated by grasses would have a much greater impact.

Actions in this alternative reduce the canopy cover of quality sage grouse nesting habitat eliminates those acres from use until the canopy cover returns to greater than 15 percent. Treatment by burning extends that recovery period to twenty to twenty-five years. When these off-site and past conditions are combined with the management of sagebrush in this alternative, the negative impacts on sage grouse populations are significantly increased. Sharp-tailed grouse will not be as affected unless the CRP acres are eliminated.

Conversion of the understory to non-native grasses also decreases the quality of the vegetation for wildlife. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approx. 21,845 acres). The private lands that are in CRP (5,555 acres) may not be beneficial to wildlife depending on the seed mix that was used. Oftentimes, crested wheatgrass was the principle component in those mixes and does not provide the quality understory desired by wildlife. BLM

has converted approximately 70,000 acres to crested wheatgrass (J. Kumm, pers. Comm). Additional acres would even further degrade the quality of the understory for wildlife and thereby reduce the success of ground nesting birds, including sage grouse and sharp-tailed grouse. However, the treatments would be in areas that are already dominated by non-natives and no increase of non-natives is predicted. Therefore, even in the acres with suitable overstory, the insufficient understory component and lack of residual vegetation for cover, reduces the effectiveness of the habitat.

Ultimately, this management alternative will probably contribute to a continued decline in sage grouse populations on the Grassland and within the GCVA because of large-scale reductions in nesting, early brooding and late brooding habitats. Sharp-tailed grouse will not be as negatively impacted unless the CRP program is eliminated and those acres are converted back to agricultural production.

Alternative B

The combination of the above activities will probably reduce populations of sage grouse and other sagebrush associated species by reducing the quality and quantity of nesting and brood rearing habitat. The increase in the diversity of the successional stages will benefit other game and non-game birds and mammals.

Actions in this alternative reduce the canopy cover of quality sage grouse nesting habitat on 5,700 acres and eliminates those acres from use until the canopy cover returns to greater than 15 percent. Approximately 71 percent (373,628 acres) of the GCVA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that are not suitable for nesting sage grouse (Gardner, 1997). However, because of successional trends, there would actually be an increase in suitable nesting habitat at the end of 1ten years.

In addition to the removal of the overstory, the maintenance of current levels and quality of the understory component continues to degrade the habitat value. The utilization rate set for upland vegetation leaves greater residual vegetation than in Alternatives A and E, however, the cover value may not be high enough to allow maximum nest success for ground nesting birds. Furthermore, this alternative allows for conversion of the understory to non-native grassesThis practice decreases the quality of the vegetation for wildlife. However, most of the treatments would be done on sites that are already dominated by non-native species. If the revegetation is done with native grasses and forbs, impacts on wildlife will be positive. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approx. 21,845 acres). The private lands that are in CRP (5,555 acres) may not be beneficial to wildlife depending on the seed mix that was used. Often, crested wheatgrass was the principle component in those mixes to increase forage for livestock. The BLM has converted approximately 70,000 acres to crested wheatgrass (J. Kumm, pers. comm). Maintenance of current understory conditions would result in maintaining current low population numbers. Therefore, even in the acres with suitable overstory, the insufficient understory component reduces the effectiveness of the habitat. Residual vegetation height is expected to increase over current conditions, decreasing potential for predation.

Ultimately, this management alternative will probably contribute to maintenance of current low sage grouse populations. Sharp-tailed grouse populations will also be maintained. However, if the adjacent CRP acres are returned to agriculture, the remaining sagebrush acres on the Grassland will become more critical to sharp-tailed grouse production.

Alternative C

The combination of the above activities will ensure that sharp-tailed grouse, sage grouse and other sagebrush obligate populations are maintained by managing the quality and quantity of nesting and brood rearing habitat in the ten-year period. The increase in the older successional stages will benefit other game and non-game birds and mammals that favor these types as well.

Minimal numbers of acres will be treated by fire and none of those acres will be in the greater than 15 percent canopy cover class. By treating these acres in smaller than 500-acre blocks, the quality of the remaining sagebrush acres is not degraded for sagebrush-associated species. When these off-site and past conditions are combined with the management of sagebrush in this alternative, the negative impacts on sage grouse populations are somewhat mitigated on both the Grassland scale and the greater GCVAA scale. The overall result is an increase in suitable nesting habitat acres for sage grouse.

The utilization rates set for riparian and upland vegetation may leave greater residual vegetation than Alternatives A, B, E and F depending on which end of the range is ultimately realized. The cover value may not be high enough to allow maximum nest success for ground nesting birds. This alternative specifies that revegetation of the understory must be to native grasses and forbs. This practice increases the quality of the vegetation for wildlife. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approx. 21,845 acres). The acres of native vegetation and amount of residual grasses for cover on the Grassland would help to improve the quality of the understory for wildlife and thereby increase the success of ground nesting birds, including sage grouse and sharp-tailed grouse. Ground-feeding songbirds will also realize a benefit from this alternative.

Ultimately, this management alternative may contribute to an increase in sage grouse populations due to an increase in quantity and quality of nesting and brood-rearing habitat.

Alternative D

The combination of the activities in this alternative will ensure that sage grouse and other sagebrush associated species habitats on Grassland lands will not be further fragmented or reduced to 0 percent canopy coverage. This would significantly mitigate for the loss of habitat on the private lands. Most private land within the proclaimed Grassland boundary (approx. 27,400 acres) has been converted to agricultural production or treated to improve forage for livestock. Either condition results in sagebrush canopy cover being eliminated or greatly reduced below the required greater than 15 percent.

This alternative also allows the available habitat to continue its successional process so that the quality of nesting and brood rearing habitat is reduced because of reduced understory. According

to computer modeling, at the end of fifty years, the available nesting habitat will comprise 19 percent of the Grassland. If that rate of change is accurate, intervention will be needed to ensure that adequate nesting habitat for viable populations is maintained over the long term.

When considered within the context of the GCVAA, the Grassland actions will also mitigate for habitat losses over the short-term. Approximately 71 percent (373,628 acres) of the GCVAA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of in less than 10 percent that is not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to provide suitable nesting habitat. With these acres unavailable to the grouse, any additional acres taken out will compound the problem of absent habitat. This alternative would ensure that no additional acres were reduced to that canopy cover class. Furthermore, those acres within the Grassland that currently fall into that category would be allowed to move towards the denser stages.

When these off-site and past conditions are combined with the management of sagebrush in this alternative, the negative impacts on sage grouse populations are greatly reduced on the Grassland scale and somewhat reduced on the GCVAA scale. However, as the canopy cover on the Grassland continues to progress towards the greater than 25 percent class, the positive impacts decline. The overall result is increasing numbers of suitable nesting habitat acres for sage grouse for short period of time and then decreasing acres as succession continues. Other sagebrush obligates may experience a similar response to conditions although not as significantly as the sage grouse. Sagebrush associates using more open stands, such as long-billed curlews and short-eared owls, will realize declines in available habitat more quickly.

Understory is important to the security of the nesting hens and foraging of broods as well as providing the appropriate environment of insects. By not allowing any grazing, riparian and upland residual vegetation will be significantly improved for wildlife. However, as the overstory begins to get too dense, the understory will begin to decline.

This management alternative may contribute to an increase in sage grouse populations due to an increase in quantity and quality of nesting and brood-rearing habitat in the short term. Over the long term, some form of intervention and treatment will be required to maintain viable wildlife populations.

Alternative E

This alternative in combination with the above activities will have the greatest negative impact on nesting sage grouse and other sagebrush associated wildlife species than any of the other alternatives except A. Sharp-tailed grouse will not be impacted as severely as sage grouse.

Actions in this alternative reduce the canopy cover of quality sage grouse nesting habitat and eliminates those acres from use until the canopy cover returns to greater than 15 percent. Approximately 71 percent (373,628 acres) of the GCVAA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that

is not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to provide suitable nesting habitat. With these acres unavailable to the grouse, any additional acres taken out will compound the problem of absent habitat.

When these off-site and past conditions are combined with the management of sagebrush in this alternative, the negative impacts on sage grouse populations are significantly increased and expand the scope of impact out to the GCVAA scale.

In addition to the removal of the overstory, the maintenance of low quantity and quality of the understory component continues to lower the habitat value. The high utilization rate set for upland vegetation leaves little residual vegetation. Furthermore, conversion of the understory to non-native grasses also decreases the quality of the vegetation for wildlife and as those acres increase, so does the impact. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approximately 21,845 acres). The private lands that are in CRP (5,555 acres) may not be beneficial to wildlife depending on the seed mix that was used. Often, crested wheatgrass was the principle component in those mixes and does not provide the quality understory desired by wildlife. BLM has converted approximately 70,000 acres to crested wheatgrass (J. Kumm, pers. Comm). Bulbous bluegrass treatments, which may have some understory diversity would be converted to crested wheatgrass, with very little understory diversity. Additional acres of reduced understory diversity would even further degrade the quality of the understory for wildlife and thereby reduce the success of ground nesting birds, including sage grouse and sharp-tailed grouse. Therefore, even in the acres with suitable overstory, the insufficient understory component reduces the effectiveness of the habitat.

Ultimately, this management alternative could contribute to a continued decline in sage grouse populations on the Grassland and within the GCVAA because of large-scale reductions in nesting, early brooding and late brooding habitats. Sharp-tailed grouse will not be impacted as severely as the sage grouse as long as other suitable nesting habitat is available. Should the CRP program be eliminated, the lands within the Grassland for sharp-tailed nesting will become much more important.

Alternative F

The combination of the above activities will have a positive impact on nesting sage grouse and other sagebrush associated wildlife species.

Actions in this alternative maintain the canopy cover of sage grouse nesting habitat over the short-term. Approximately 71 percent (373,628 acres) of the GCVAA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that is not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to

provide suitable nesting habitat. With these acres unavailable to the grouse, any additional acres taken out would compound the problem of absent habitat.

In addition to the changes in the overstory, the quantity and quality of the understory component affects the habitat value. The utilization rates set for riparian and upland vegetation may leave greater residual vegetation than Alternatives A, B, C and E depending on which end of the range is ultimately realized. The cover value may not be high enough to allow maximum nest success for ground nesting birds. This alternative specifies that revegetation of the understory must be to native grasses and forbs. This practice increases the quality of the vegetation for wildlife. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approximately 21,845 acres). The acres of native vegetation on the Grassland would help to improve the quality of the understory for wildlife and thereby increase the success of ground-nesting birds, including sage grouse and sharp-tailed grouse. Ground-feeding songbirds will also realize a benefit from this alternative.

Ultimately, this management alternative could contribute to continued maintenance of sage grouse populations on the Grassland and within the GCVAA because of maintenance of nesting and early brooding habitats. This is a result of maintenance of current levels nesting and brood-rearing habitat, more residual vegetation to provide cover and improvement of understory diversity. Sharp-tailed grouse habitat willwill also be improved. Should the CRP program be eliminated, the lands within the Grassland for sharp-tailed nesting will become much more important.

Alternative G

This alternative in combination with the above activities improve habitat for sage grouse and other sagebrush obligate populations. Approximately 71 percent (373,628 acres) of the GCVAA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that is not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to provide suitable nesting habitat. With these acres unavailable to the grouse, any additional acres taken out will compound the problem of absent habitat.

When these off-site and past conditions are combined with the management of sagebrush in this alternative, the negative impacts on sage grouse populations are not significantly different than the current situation. This alternative increases levels of nesting and brood-rearing habitat, based on canopy cover. The expanded riparian zone with minimal grazing will improve the late summer brooding habitat.

The quantity and quality of the understory component affects the habitat value. The utilization rate set for upland vegetation improves residual vegetation but may not leave the seven inches recommended for sage grouse nesting. Furthermore, conversion of the understory to non-native grasses also decreases the quality of the vegetation for wildlife and as those acres increase, so does the impact. However, this alternative may increase understory conditions on 1,250 acres.

Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approximately 21,845 acres). The private lands that are in CRP (5,555 acres) may not be beneficial to wildlife depending on the seed mix that was used. Often, crested wheatgrass was the principle component in those mixes and does not provide the quality understory desired by wildlife. BLM has converted approximately 70,000 acres to crested wheatgrass (J. Kumm, pers. comm). Additional acres of non-native understory would even further degrade the quality of the understory for wildlife and thereby reduce the success of ground nesting birds, including sage grouse and sharp-tailed grouse. Therefore, even in the acres with suitable overstory, the insufficient understory component reduces the effectiveness of the habitat.

Ultimately, this management alternative could contribute to stable sage grouse populations due to management effects on the quantity and quality of nesting and brood-rearing habitat. Sharp-tailed grouse will not be impacted as long as other suitable nesting habitat is available. Should the CRP program be eliminated, the lands within the Grassland for sharp-tailed nesting will become much more important.

Alternative H

Actions in this alternative maintain the canopy cover of quality sage grouse nesting habitat on the Curlew over the short-term. Approximately 71 percent (373,628 acres) of the GCVAA is potential sage grouse habitat. Of those acres, 67 percent (251,768 acres) has a sagebrush canopy cover of less than 10 percent that is not suitable for nesting sage grouse (Gardner, 1997). Adjacent BLM lands have experienced wildfire impacts on 57,803 acres since 1990 (J. Kumm, pers. comm.). Those acres have not had time to return to pre-fire sagebrush canopy cover and therefore are not able to provide suitable nesting habitat. With these acres unavailable to the grouse, any additional acres taken out will compound the problem of absent habitat.

The utilization rates set for riparian and upland vegetation may leave greater residual vegetation than Alternatives A, B, C and E depending on which end of the range is ultimately realized. The cover value may not be high enough to allow maximum nest success for ground nesting birds. This alternative specifies that revegetation of the understory is to native and/or non-native grasses and forbs. Within the Grassland, 35,600 acres have already been converted to non-native grasses. Most private lands within and around the Grassland have also been converted (approximately 21,845 acres). The acres of native vegetation on the Grassland would help to improve the quality of the understory for wildlife and thereby increase the success of ground-nesting birds, including sage grouse and sharp-tailed grouse. Ground-feeding songbirds will also realize a benefit from this alternative.

Ultimately, this management alternative should maintain sage grouse populations on the Grassland and within the GCVAA because of maintenance of nesting and early brooding habitats. Sharp-tailed grouse will not be impacted as severely as the sage grouse as long as other suitable nesting habitat is available. Should the CRP program be eliminated, the lands within the Grassland for sharp-tailed nesting will become much more important.

Economics

The cumulative actions interacting with the effects of all Grassland alternatives include the following past, present, and reasonably foreseeable future actions:

- Other economic activity in industrial sectors within Oneida County
- Permitted grazing activities on other Federal ownerships, such as BLM
- Private land grazing by Grassland permittees
- Changes or volatility in the livestock markets influencing grazing permittees on the Grassland
- Financial condition and diversification of individual Grassland permittee's ranching operations

Strong economic activity within other Farm and Non-Farm related industries could offset any potential reduction in the Range-Fed Cattle sector's contribution to the Oneida County economy. The proportion of jobs and income in this sector is small. From 1985 to 1997, farm-related jobs and income declined while total jobs and earnings increased in Oneida County, largely driven by other industries. Weak economic conditions, such as cyclical economic downturn like those that occurred in the early 1980's and early 1990's would likely not be measurably affected solely by changes in Grassland grazing opportunity.

The Range-Fed Cattle industrial sector is generally made up of jobs and incomes related to open range grazing on Federal lands and private rangelands. The relative proportion of National Grassland and BLM lands are displayed in Chapter 3, Affected Environment. The amount of private rangeland that contributes to economic activity in the Range-Fed Cattle sector is not known. However, the relative average of the Grassland within the County is very small, approximately 6 percent of Oneida County and 9 percent of the Greater Curlew Valley. Consequently, though not known specifically, the contribution of Federal grazing on the Grassland to the broader Oneida County economy is considered to be quite small. Changes in permitted grazing numbers alone under any of the alternatives would not be expected to impact Oneida County economy in any measurable way.

According to BLM personnel, few members of the Curlew Valley Grazing Association and no members of the Buist Grazing Association hold BLM livestock grazing permits. These two associations generally rely on grazing either Federal lands outside of Oneida County or other non-Federal land within and outside the County to round out their operations. The sources of other grazing opportunity by the Grassland associations are not known.

Approximately 33,380 permitted AUMs (Animal Unit Month) graze in three allotments on BLM land within the Curlew Valley. No changes in these numbers are expected in the foreseeable future. No cumulative economic effect is anticipated as a result of changes in grazing numbers on the Grassland.

The cumulative economic effects of changes in grazing opportunity in the alternatives would most likely impact specific livestock operators who are members of the Curlew Valley or Buist

Grazing Associations and who graze on the Grassland as part of their overall ranching operations. The specific impacts to individual permittees are unknown, but the effect can be qualitatively estimated in the form of relative risk to the cattle operation as on ongoing enterprise.

Permittees most affected by reductions would be those that are currently in the most vulnerable financial condition or least diversified among other business activities, such as grain, crops, hay, or outside employment. These permittees would be least able to afford a loss in grazing opportunity. Cumulative effects from reductions in grazing numbers interacting with a soft or severe market for live beef, and a vulnerable financial condition, could place some operators at higher risk, including potentially causing a sale of the operation or going out of business entirely.

Other financially stronger livestock operators could benefit in the long term as the financially vulnerable operators are bought out or transfer their grazing permits. These permittees, or new operators, could pick up the vacant permits and expand their operations. The extent of these personal or enterprise-specific conditions, dislocations are not known and cannot be predicted in the scope of this analysis.

Livestock Grazing

Livestock grazing has been an historic use of the Grassland. Currently, several permittees hold Forest Service and BLM grazing permits in the area. All alternatives, with the exception of Alternatives A and E would result in an initial reduction as well as incremental reductions over the ten-year plan period as treatments are implemented at the site-specific level. In Alternative B, C, D, F and G, forage productions levels during the ten-year plan period are projected to decline, based on treatments proposed in each alternative. In order to maintain sustainability of rangeland resources, additional reductions could be expected as production drops.

Additionally, if the sage grouse or sharp-tailed grouse are listed under the Endangered Species Act, recovery plans could propose guidelines that could result in further reductions over time. If additional private lands are placed into the CRP program, some additional habitat might be available that could offset reductions on public land. Permittees or federal agencies could be financially impacted if additional rangeland developments, such as fencing and water developments, are required.

Travel and Scenery

Nationally, opportunities for OHVs to travel cross-country on public land are decreasing. Within the state of Idaho's Travel Region Five, cross-country travel opportunities have remained the same for the last decade. The Caribou National Forest, the Bureau of Land Management and the Curlew National Grassland are the primary federal land managers within the travel region. The Caribou National Forest is revising its Forest Plan. The revised management plan may or may not change cross-country travel on portions of the Forest currently open to cross-country travel. The Bureau of Land Management is in the process of drafting national policy regarding OHV use. The policy may or may not change cross-country travel on local BLM administered lands.

Even if opportunities to travel cross-country on public lands decreases, OHV use on designated routes (established roads and trails) will not be affected.

Specifically Required Disclosures

This section contains disclosures or effects that are specifically required by federal law, regulation, or policy.

Required disclosures associated with timber management under the National Forest Management Act or the Idaho Forest Practices Act are not addressed in this section because the Curlew National Grassland is rangeland and does not support forest vegetation.

Endangered Species Act

The U.S. Fish and Wildlife Service determined that habitat for Ute ladies' –tresses, yellow-billed cuckoo, gray wolf and Canada lynx may occur on the Grassland. A Biological Assessment (BA) was prepared for the Grassland Plan that determined there would be no effect on these species. The BA was transmitted to the U.S. Fish and Wildlife Service on November 27, 2001. This project is in compliance with the Endangered Species Act.

Clean Air Act

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity. However some prescribed burning may occur under the direction in the Proposed Plan. The State of Idaho regulates air pollution control through Title 39 of the Idaho Code. The Forest Service protects air quality through compliance with the rules, regulations and permit procedures of the Idaho Department of Environmental Quality. To the extent possible, the Forest Service will continue to cooperate with other Federal, State and local air quality regulatory agencies to maintain and improve air quality. During burning treatments, the Forest Service follows the Montana/North Idaho Smoke Management Plan and Program.

National Historic Preservation Act

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity. Site-specific activities undertaken in response to the direction in this Plan will fully comply with the laws and regulations that insure the protection of the Nation's cultural resources.

Clean Water Act

The Federal lands comprising Curlew National Grasslands are intermingled with adjacent private and public lands that are managed by the BLM. The majority of the watersheds within which the Grassland is situated, lie outside of the 46,000 acres administered by the Forest Service. Thus watershed condition and water quality on the Grassland is directly influenced by the activities of other owners that occur upstream, outside of the boundary of the Grassland. The South Fork of

Rock Creek has been identified by the State of Idaho as a water quality limited stream under Section 303(d) of the Act. Sediment has been determined to be the primary pollutant limiting beneficial use attainment. Total Maximum Daily Loads (TMDLs) for sediment have been set by the State. These standards apply to all landowners within the watershed. The State has also collected water quality samples in other streams within the Curlew Valley. Preliminary indications are that other waters within the valley are also quality limited, but no official determination has been made to date.

About half of the riparian areas in Grassland have recently been included in riparian pastures. The proposed Land and Resource Management Plan would establish forage utilization standards for the riparian pastures and fence selected remaining riparian areas to exclude livestock, except on a periodic basis. These changes should help improve water quality and meet beneficial use criteria within the Grassland. The full outcome of efforts to improve water quality is, however, dependent on the actions of all landowners in these watersheds, both public and private.

Migratory Bird Treaty Act

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity. Direction in the Proposed Plan will insure that site specific activities are planned and implemented to minimize impacts and maintain or improve migratory bird habitat. A relatively low level of sagebrush treatment is proposed to maintain productivity and diversity. Riparian areas that are not currently in riparian pastures are planned to be fenced.

Prime Farmland, Rangeland, and Forest Land

All alternatives in this Plan are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farmland, rangeland, and forestland. Regardless of the alternative, National Forest System lands will be managed with sensitivity to any adjacent private and public lands.

Energy Requirement and Conservation Potential

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity. Because the scope of the proposed action is so limited both in terms of geographic area and extent of planned activities, planned actions under any alternative analyzed in the EIS will have little or no effect on current local energy use and offer little or not opportunity for energy conservation in the local area.

Effects on Human Environment

Human uses and values provided by the Grasslands are described in Chapter 3, Section three of the EIS. The effects of alternative actions on the human environment are described in Chapter 4 of the EIS. Specifically the effects on Economic and Social Factors including effects on economics and livestock grazing are addressed.

Equal Employment Opportunity

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity nor will it have any effect on employment opportunity. Federal actions undertaken in response to the direction in the Proposed Plan will not effect equal opportunity employment nor are they expected to effect equal employment opportunities in the private sector. The government is and equal opportunity employer and this fact is disclose in both the EIS for Curlew National Grassland and the Proposed Plan. The civil rights of any citizen, including women and minorities, will not be differentially affected by the implementation of any alternative.

Wetlands and Floodplains

The Proposed Plan provides direction to improve riparian areas and the associated wetlands and floodplains. Improvements in riparian areas are expected to be achieved through project level planning and implementation of livestock forage utilization standards in riparian pastures and fencing of selected riparian areas.

Unavoidable Adverse Environmental Effects

Preparation of a Land and Resource Management Plan is a programmatic action and as such does not authorize any site-specific activity. However the effects on environment that might result from project level implementation of any of the alternatives analyzed in the EIS include some unavoidable adverse environmental effects. These are discussed as irreversible and irretrievable effects in Chapter 4 of the EIS.

Short-Term Uses of the Human Environment and the Maintenance of Long-term Productivity

Chapter 2 of the EIS describes the alternative sets of short-term and long uses of the human environment. The principals of multiple use and sustainability guided alternative development. All proposed activities are within the capability of the land to insure that long-term productivity is not impaired by proposed management practices or other short and long term uses.

Conflicts with Other Agency Goals and Objectives

Consultation with other agencies indicates that there are no major conflicts between the Proposed Plan and the goals and objectives of other government entities.

Environmental Justice

The social and economic environment that might be affected by the proposed action is described in Chapter 3 of the EIS. No minority or low-income communities were identified. Thus the effects of alternatives analyzed in the EIS are not likely to fall disproportionately on a minority and/or low-income community.